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The Chairman of the G.W.R.

THE unanimous election of Mr. Charles J. Hambro to the chairmanship of the Great Western Railway Company in place of the late Lord Horne, brings to the highest office of the company one of the youngest railway directors. At 43 Mr. Hambro may even eclipse the record of 26 years in office enjoyed by Lord Churchill, who was a year older when he was elected to the chair. Unlike his immediate predecessors, Mr. Hambro has been actively engaged in business since his early twenties, and has achieved outstanding success in both commerce and finance. His wide and expert knowledge of industry should prove of great value in his new appointment, of which he has gained an intimate knowledge in his work as a Deputy Chairman since 1934. Mr. Hambro's new post forges a further link in the chain of association between the House of Hambro and railways in Europe which has been one of the characteristics of its long history; in THE RAILWAY GAZETTE of May 17 some details were given of the many occasions on which the merchant banking house of which the new G.W.R. Chairman, with his brother, Mr. John Henry Hambro, represents the present generation, had been the means of financing railways in Denmark, Finland, and Italy.

* * * *

Sir James Milne

In electing Sir James Milne (who continues to be General Manager) to the board of dirctors to fill the vacancy created by the death of Lord Horne, the directors of the Great Western Railway company have recognised the outstanding services which Sir James has rendered not only his own company but also the British railways generally in time of particular difficulty. Before the outbreak of war he played a leading part in the negotiations with the Government which preceded control of the railways and was intimately connected with the discussions which resulted in the financial agreement to operate during the period of control. His work on the Railway Executive Committee has been arduous but his wide personal experience of railway working, gained during his early years in various departments of the company, coupled with his flair for administration, has proved of the greatest value. In the present scheme of Government control his background of previous work for the State—he was one-time Director of Statistics at the Ministry of Transport and was later selected to assist the Committee on National Expenditure—has stood him in good stead. His participation in the labours of the Indian Retrenchment Committee added to his already extensive knowledge of affairs and his constant and intimate contact with transport problems in this country since he became General Manager of the G.W.R. in 1929 has fully equipped him for his new responsibilities.

* * * *

General Managers as Directors

The proposal to elect Sir James Milne to the board of the Great Western Railway Company, while he continues to hold the office of General Manager, is not unprecedented. The appointment entails special legislative provision to alter certain restrictions contained in the Great Western Railway Act, 1835, and in the Companies Clauses Consolidation Act, 1845. One precedent for the alteration of the law in this matter was the case of the late Mr. James Staats Forbes who many years ago was authorised by special Act to be at the same time a Director as well as General Manager of the Metropolitan District Railway. A more recent instance is the Metropolitan Railway Act, 1922, which, in order to enable the late Mr. R. H. Selbie to be a Director as well as General Manager of the company, provided that "notwithstanding anything contained in the Companies Clauses Consolidation Act, 1845, or any other

Act to the contrary, no person shall be disqualified from being a director of the company, by reason of his holding or continuing to hold any office or place of trust or profit under the company." A section of the London Midland & Scottish Railway Act, 1927, regulates the position of Lord Stamp and is in two parts. The first removes the disqualification contained in the 1845 Act, and the second part was required in consequence of the new method of organisation under a President of the Executive, as it was desired to have at least one representative of the administration on the board.

* * * *

Retired Officers as Directors.

Although, as stated in the foregoing note, the election of a general manager to the board of a railway company is not unprecedented, it has, of course, been quite a common practice on a number of British railways for retired officers to become directors. One exception for many years past has been the Great Western Railway, which, however, has numbered two of its distinguished officers among its chairmen, namely, Sir Daniel Gooch, the company's first Locomotive Superintendent, who was elected to the board in 1865, became Chairman the same year and continued as Chairman until 1889. The other was Mr. F. G. Saunders, who was Secretary of the company from 1863 to 1886, and was a member of the board for nine years after his retirement from that office in 1886. He succeeded Sir Daniel Gooch as Chairman in 1889 and held that office until 1895. Since then with that company it has become an unwritten law that the election of an ex-officer to the board is undesirable as it might "spoil the pace" of his successor. Mr. Eric Loder, later Lord Wakehurst, while he was Chairman of the Southern Railway Company, at a luncheon of the Retired Railway Officers' Society on March 8, 1934, expressed the view that there were no more valuable members of a railway board than retired railway officers. At the present time the Southern numbers three ex-officers—Sir Francis Dent, Sir Charles Morgan, and Sir Herbert Walker—among its directors, and until the recent retirement of the late Mr. Charles Sheath, had four. Other instances of retired railway officers who have become directors include Sir Guy Granet, Sir Thomas Williams, Mr. Oliver Bury, and Sir George Gibb. Further back in railway history there have been many others. Some which come readily to mind are Sir Charles Owens, Sir Charles Scotter, Sir Henry Tennant, and Mr. William Cawkwell, who was General Manager of the L.N.W.R. from 1858 to 1880, was elected to the board in 1873, and served as Deputy Chairman from 1884 to 1897.

* * * *

Overseas Railway Traffics

An increase of 285,000 pesos in the traffic returns of the Buenos Ayres Great Southern Railway for the 9th week of the financial year has been followed by a decrease of 47,000 pesos for the 10th week. The Argentine North Eastern has shown an improvement in each of the two weeks, amounting altogether to 28,800 pesos. Otherwise Argentine railway traffics continue downwards. Antofagasta receipts have fallen £4,700 in the 35th and 36th weeks of 1940, but there is still an aggregate increase of £146,660. Among Brazilian railways, the San Paulo in the 34th and 35th weeks shows advances both in sterling and in currency, and to date is up by £156,308 and 389 contos. Leopoldina traffics in the aggregate are £86,140 better in sterling, but are down in currency.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Increase or Decrease
Buenos Ayres & Pacific* ...	10th	1,089	– 114	11,110	– 1,362
Buenos Ayres Great Southern*	10th	1,724	– 47	19,138	– 48
Buenos Ayres Western* ...	10th	562	– 106	6,122	– 624
Central Argentine*	10th	1,363	– 756	14,278	– 6,710
		£	£	£	£
Canadian Pacific	36th	706,000	– 95,400	21,946,200	+ 3,920,600
Bombay, Baroda & Central India	22nd	254,850	+ 47,100	3,957,975	+ 453,150

* Traffic returns in thousands of pesos.

In the latest traffic return of the Canadian Pacific the decrease of £95,400 goes against an increase of £265,200 a year ago.

* * * *

A.T.C. and Cab Signals in the U.S.A.

From recently published official figures it appears that a total of some 20,500 track miles of U.S.A. railways are fitted with some form of A.T.C. or cab signalling, or combinations of them in various forms. Intermittent A.T.C. without speed control shows the largest track mileage, namely, 11,662, the next most used arrangement being plain cab signals without train control, but with fixed signals as well, on 6,078 track miles. Then comes continuous A.T.C., speed control and cab signals combined on 1,883 track miles, and train control with cab signals only—no fixed signals along the line—on 1,758 miles. Cab signals without fixed signals or A.T.C. are found on 11 miles only. Over 4,000 locomotives and motor coaches are equipped. These particulars are interesting but, as pointed out in our issue of May 24, 1940 (page 753), some extraordinary accidents have occurred due to running with the apparatus out of order or, as in the case of the Rocky Ridge accident, reported in our issue of November 11, 1938 (page 835), cancelling a warning and driving on in disregard of it.

* * * *

Railway Assessments

The recently-published report of the Railway Assessment Authority for the year ended March 31, 1940, places on record the progress made with the second roll, which embodies the valuations of the four main-line railway companies for the quinquennial period 1936-1941. Of the four valuations, the Southern has reached the revision stage, and those of the three other companies the completion stage. Two contentions on points of principle have been made by the three last-mentioned companies in their appeals against the completed rolls. First, that advertisements attached to railway property should be assessed with the railway hereditaments; and, secondly, that "let-out" premises which have been excluded from the railway hereditaments but have become vacant should be treated as part of that hereditament even although they may not be actually used by a railway company. In the L.M.S.R. and L.N.E.R. appeals it is contended that areas of land which are occupied from time to time by traders in excess of the areas actually let to them under agreement should not be excluded from the railway hereditament. The G.W.R. appeal raises other points, *e.g.* the correctness of the exclusion of fixed-space accommodation, stacking grounds not the subject of tenancies, accommodation used by cartage agents free of rent, and particularly, the classification of offices, kiosks, canals, and other premises under the de-rating Acts.

* * * *

A Single-line Runaway Collision

A summary of Mr. J. L. M. Moore's report on the collision near Aviemore, L.M.S.R., on March 5, 1940, appears on page 312. Some wagons became detached through the failure of a drawbar hook and running back about 9 miles down steep gradients, collided with a freight train, killing the driver and fireman of the leading engine, and doing extensive damage. There is some criticism of the staff concerned, but the chief interest of the report lies in Mr. Moore's recommendation that electrically-controlled catchpoints should be provided on this and similar single line sections where long falling gradients introduce considerable risk should vehicles break away. The provision of catchpoints on single lines is not an easy matter, but the L.M.S.R. has made proposals for meeting the difficulties and Mr. Moore approves of them in principle, subject to certain electric interlocking requirements being fully met. The circuits for the proposed catchpoint control should prove of much interest and form an important development in electrical interlocking controlled by token apparatus.

* * * *

Livestock Transport by U.S.A. Railways

The National Livestock Loss Prevention Board in the U.S.A. has recently completed a survey of the relative safety of rail and motor lorry transport of livestock at five of the leading marketing centres in the mid-west, namely, St. Paul, Sioux City, Omaha, St. Joseph, and Kansas City. From this survey the board has concluded that nearly three times as many cattle and calves transported to market by motor lorry were dead on arrival, as compared with those conveyed by rail, in proportion to the number transported. Dr. W. T. Spencer, Livestock Commissioner of the Omaha Livestock

Exchange, and Regional Manager of the Livestock Loss Prevention Board, states that, since the beginning of the heavy movement of livestock to market in motor lorries, there has been a marked increase in losses due to animals of all classes arriving dead or in crippled condition, and he is of opinion that one of the most important reasons for this increase is the mixed loading in motor lorries of cattle and hogs together, without proper partitions. This view is supported by the 1939 report of the N.L.L.P.B. which shows that the divergence between the percentages of animals killed or injured during transit by motor lorry and by rail respectively has been increasing.

* * * *

The Railway Train of 2040

Many and varied are the prognostications respecting the probable form that railway trains will take a hundred years hence. Those prophets who venture to look ahead and base their assumptions on what they believe to be the most likely lines of development, appear to take the greatest interest in the phase of railway activity which concerns the propulsion of high-speed trains. Some of these voice a conviction that steam will have been superseded as the motive power for this class of traffic, but others pin their faith to the retention of steam at greatly increased pressures and higher superheat temperatures, used in conjunction with light, high-speed engines driving individual or grouped axles through the medium of gearing. Improved boiler performance (by what means is not specified) and greater economy in the use of the steam are favourable pointers, the details of which can be worked out more or less according to fancy. Then there are the diesel and electric traction schools, foretelling wonderful developments, many of which although mainly prophetic in present circumstances, contain at least the germ of quite feasible adaptability in the future. Those again who belong to more "advanced" camps rule out orthodox lines of development altogether and claim that the fastest express trains of the future will not run on the earth at all but proceed, at phenomenal speeds, some considerable height above it.

* * * *

Restaurant Cars—Past and Future

IT is a curious fact that in Great Britain the first dining cars and the first corridor trains were not associated ideas; both were introduced independently, and it was not until later that the obvious value of the train corridor in giving access to the restaurant accommodation was turned to practical account. The first dining car experiment was made by the Great Northern Railway in 1879, between London and Leeds, and this was, in effect, a development of the Pullman principle already established in the U.S.A.—a first class vehicle with restaurant service in which the traveller remained throughout the journey. In the next decade or so, as dining cars came gradually into use on other lines, the plan was tried of vestibuling one or two coaches to the dining car proper, but this was with the intention of increasing the number of seats in the cars that could be served from one kitchen rather than that of providing access to the cars from the trains. On the other hand, when the Great Western Railway, in March, 1892, put into service between Paddington and Birkenhead the first complete corridor train, it had no restaurant car, and the newspaper comment on its introduction dwelt at length on the fact that there would be no possibility of the passengers in the humbler classes mixing with their betters, for the connecting doors between the coaches were to be kept locked by means of a key in the possession of the guard. In the next year corridor trains complete with restaurant cars—particularly the afternoon Anglo-Scottish expresses—made their appearance, but on some railways, as for example, the Great Eastern, restaurant car sets isolated from their trains persisted well into the present century.

Since these early days, restaurant car practice in Great Britain has developed on varied lines. The old Midland Railway, with trains of relatively light formation, provided independent first and third class cars and encouraged passengers taking meals to travel in them, so that the weight of stock which earned revenue only in the service of meals was confined to the part of one car given up to kitchen and pantry. The Great Western Railway, on the other hand, evolved by degrees a type of car more nearly approaching the travelling restaurant, accessible only at mealtimes, in which passengers of all classes fed together; this became the general standard on the mainland of Europe also. In more recent years the development of restaurant car patronage in Great Britain has been on so extensive a scale that the exclusion of passengers from cars save at mealtimes has become general; and to provide adequate seating for the simultaneous service of 80 to 100 meals many three-car sets, with open first and third class vestibule cars flanking a central kitchen car, have been put into service, with the result that from 85 to nearly 100 tons of train tare weight are devoted exclusively to the service of meals. On the other hand, the Pullman practice of providing more than one kitchen in the same train, to enable all passengers to be served where they sit, has been followed by similar arrangements on the L.N.E.R. Coronation, West Riding Limited, and East Anglian; in such trains the corridors, instead of giving passengers access to the restaurant cars, afford the restaurant car staffs access to the passengers, and in effect extend to entire trains the principle of the first dining car of 1879. On the late L.N.W.R. the practice of running two independent sets of restaurant cars, for different destinations, in the same train has in some measure been continued by the L.M.S.R., and up to the war such a train as the Merseyside Express was provided with two kitchen cars in order to make possible simultaneous service to four or five open vestibule cars. With the onset of war, the L.M.S.R. reverted to the practice of permitting passengers to use the restaurant cars as seating, and, further, on most trains reduced the restaurant equipment to two-car sets, in order to restrict as far as possible the weight of train formations. The L.N.E.R., however, has not only retained in service its triplet articulated restaurant sets, but also, like the G.W.R. (which has reverted to the use of single cars), continues to exclude passengers from them except at mealtimes.

Probably the most important wartime restaurant car development has been the institution by the L.M.S.R. and L.N.E.R. Companies of the standard half-crown breakfast, lunch, and dinner, and it may be hoped that this desirable innovation—with any modification of price that may be necessitated by post-war currency changes—will survive the war. From the railway points of view, against the reduced revenue per meal may be set an increased number of participants, a shorter time needed for meal service, and less work for the staff—with fewer courses—making reduced car staffs possible. The traveller obtains an adequate meal—consisting, at lunch or dinner, of soup, joint or entrée and vegetables, and sweets or cheese—at a very reasonable charge; and the requirements of those who desire something more extensive would be met by the provision of a limited range of *à la carte* items, such as grapefruit, *hors d'oeuvres*, savouries, or dessert, which could be added to the basic meal at an appropriate extra. The modern American method of two types of car in the same train—a dining car and a light refreshment car—has much to commend it, as this gives the passenger a choice between the *table d'hôte* and a lighter meal; this plan was tried on the 1938 L.N.E.R. Flying Scotsman, but it needs something less weighty than a 93-ton restaurant set and a 44-ton buffet car to popularise the idea with railway operating officers. It might be profitable to experiment on long-distance journeys with a 42-seater or 30-seater restaurant and kitchen car of the G.W.R. common-class type, with the kitchen end attached to a vestibuled first used partly for meals and partly for seating; and to marshal elsewhere in the train a buffet car with counter and some seating, where light meals of the kind so admirably served in G.W.R. buffet cars, and those of the North Eastern Area of the L.N.E.R., could be obtained. It would be possible in this way to restrict the weight of stock used solely for refreshment purposes to between 75 and 100 tons a train, and at the same time to provide meal service at a range of cost to suit all pockets. In any event it seems fairly certain that after the war the reduced means of the travelling public will call for more democratic catering methods on the part of the railway companies than those obtaining on not a few lines before the war began.

XUM

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Standard Engines for Indian Railways

100, Eton Rise,
Haverstock Hill, N.W.3
September 9

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I have read with interest the very good description of a new Indian standard 4-6-2 broad-gauge locomotive published in your issue of July 26. It is noted that considerable attention has been given to weight reduction, and the total of 84 tons, quoted as the weight of the engine only, therefore arrested attention. In order to obtain a general idea of the design, comparison must be made with other engines, and the accompanying tabular statement has been drawn up giving the principal dimensions of selected examples of passenger engines for the broad-gauge lines. I have collected the particulars given, so far as the dimensions are concerned, from various sources, and trust they are correct. The ratios of proportions have been calculated, and are put forward as giving a general analysis of each of the engines examined.

The efficiency of a design is usually measured by the weight allowed for each square foot of heating surface, the evaporative value of which is dependent upon the value of the heating-surface/grate-area ratio. Attention is therefore drawn to this latter factor, which as will be seen varies little as between one design and another, for the reason that all engines must use the same kind of fuel. How the new Class "WL" engines compare with the others will be seen from the table. It is interesting to note how very closely the new engine resembles the previous "XA" design, though unfortunately, as I do not know the wheelbase of the "XA," I cannot compare the weights on this basis. In 1937 two notable experimental engines were built for the I.S.R., G.I.P. system, and a comparison is given with the "XB" where it is shown that for practically equal boiler capacities a further 9 tons of weight was built into the "XP" engines, which at the same time have a 20 per cent. greater boiler demand factor. Further comment will be unnecessary.

For many years the B.E.S.A. 4-6-0 "Mail" engines have done excellent work on all the Indian 5 ft. 6 in. lines, and I show in the table the original design using saturated steam, and the same engine when superheated. In certain cases the cylinders are larger, but the example is possibly representative. The B.N.R. engine, Class "G.S.M.," introduced in 1937, is an attempt to develop further the 4-6-0, and, in the matter of weight per square foot of heating surface, is an outstanding example of efficient designing. It will further be noted that so far as weight concentration is concerned the weight per foot of engine wheelbase is for all practical purposes equal to that of the same engine type superheated when built on the same centres as the saturated steam prototype—a further indication of the skill exercised in preparing this design. Compared with the 4-6-2 "XP," it is not quite so powerful, as the boiler is smaller, while the steaming and cylinder capacities bear much the same relationship to each other. To those who know and are interested in Indian locomotives the tabulated data given will no doubt be found of value. While it is not pretended that the original engines as first standardised are suitable for present requirements, it is certain that their simple construction must appeal to many and lead to the question as to the real value of all the refinements and additions now considered necessary to complete an efficient locomotive.

I am, Sir,
Yours faithfully,
E. C. POULTNEY

INDIAN RAILWAYS PROPORTIONS OF BROAD GAUGE ENGINES

	INDIAN RAILWAYS STANDARDS					B.N.R.		B.E.S.A.
Class	WL	XP	XC	XB	XA	G.S.M.	Suptre.	Sat.
Type	4-6-2	4-6-2	4-6-2	4-6-2	4-6-2	4-6-0	4-6-0	4-6-0
Cyls., dia. and stroke, in.	18½ × 28	21½ × 28	23 × 28	21½ × 28	18 × 26	21½ × 26	20½ × 26	19 × 26
Coupled wheels, dia., in.	67	74	74	74	61½	73½	74	74
Steam pressure	210	210	180	180	180	200	180	180
Heating surfaces :—								
Tubes and flues, sq. ft.	1,562	1,543	2,200	1,642	1,263	1,398·4	1,328	1,833
Firebox ,,	200	242	229	198	136	201·6	152	157
Evap. total ,,	1,762	1,785	2,429	1,840	1,399	1,600·0	1,480	1,990
Superheater ,,	442	504	636	463	348	317·0	352	—
Combined ,,	2,204	2,289	3,065	2,303	1,747	1,917·0	1,832	—
Grate area ,,	38	45	51	45	32	38·0	32	32
Engine weight, tons	84·25	99·0	97·1	90·25	66·6	74·9	76·5	69·0
Adhesive ,, ,,	47·55	55·78	59·1	51·0	39·0	50·8	54·0	50·5
Wheelbase : engine, ft. and in.	34—7	36—10	35—1	33—7	—	26—7	27—3	27—3
Rated tractive force, lbs.	25,530	31,220	30,625	26,760	20,960	27,787	22,724	19,400
Ratios :—								
R.T.F. × dia. of drivers / Evap. heat. surface	971	1,292	1,014	1,076	921	1,273	1,170	723
R.T.F. ÷ Grate area	672	694	602	595	652	731	710	606
Evap. heat. surface / Grate area	46·4	39·6	47·6	40·8	43·7	42·2	46·2	62·2
Engine weight— / Evap. heat. surface lbs.	106·9	124·1	89·5	110·0	106·4	104·7	116·0	77·7
Engine weight— / Comb. heat. surface lbs.	85·4	96·8	70·7	87·5	85·6	87·8	93·6	—
Weight per ft. of engine wheelbase	2·44	2·68	2·77	2·68	—	2·82	2·81	2·5
Adhesive weight per cent. of total	56·4	56·3	60·8	56·7	57·9	69·2	70·6	73·2
Adhesive factor	4·17	4·0	4·3	4·27	4·16	4·1	5·32	5·82

[The references to weight saving in the article referred to by our correspondent may have given the impression that a high power/weight ratio had been aimed at in the "WL" locomotives. This, however, is not so, and the special measures taken to save weight were necessary in order to meet the axleload limitations and at the same time comply with other specified requirements. In considering the question of weight, due regard must be given to the general practice of the railway concerned, and to the particular requirements as to special fittings and other equipment, certain items of which add considerably to the weight when compared with locomotives not so equipped. This particularly applies to the "XP" engines which were built for the purpose of trying out a number of experimental features which might be found to have beneficial effects outweighing any apparent disadvantage in the power/weight ratio. The wheelbase of the "XA" locomotive is 30 ft. 7 in.—ED. *R.G.*]

B.S.S. FOR CARBON STEEL CASTINGS.—A revised British Standard Specification for Carbon Steel Castings has been published (B.S. 592—1940) and covers steel castings for ships and for marine engine and general engineering purposes. It supersedes B.S. Nos. 30—107, 592—1935, and 5028—1924. Copies may be had from the British Standards Institution, 28, Victoria Street, S.W.1, price 2s. 3d. post free.

PUBLICATIONS RECEIVED

The Sirhowy Valley and its Railways. By D. S. Barrie and Charles E. Lee. London: The Railway Publishing Co. Ltd., 33, Tothill Street, 6¾ in. × 9¾ in. Price 3s. 6d. net.—A knowledge of early railway development in the south-west is much less extensive than that of the early railways in the north-east of England, yet the former is no less interesting than the latter. This little book has the special merit in that it throws into relief certain essential and remarkable differences between the railways in the two areas. In the Sirhowy Valley is epitomised a line of development in certain important respects almost opposite to that of north-east England, where the early railways were built for the special use of the owner's rolling stock, and the rail carried a flanged wheel; on the other hand in the Sirhowy Valley the plate rail was adopted, with the idea that it might be used by wagons also capable of traversing the ordinary highway, and it was probably this public use of the railways here which led to their adoption for passenger traffic much earlier than it developed elsewhere. The Oystermouth Railway, on which passenger traffic began on March 25, 1807, was the first in the country to carry such traffic. The two authors are well-equipped for their task, Mr. Barrie by his close topographical knowledge of, and family associations with, the Monmouthshire and South Wales valleys, and Mr. Lee by his comprehensive investigations into the genesis of railway transport. Certain of the material was published in serial form in *The Railway Magazine*, but the brochure contains the results of a good deal of additional research.

W. A. WILLOX

The Corrosion of Iron and Steel. By J. C. Hudson. London: Chapman & Hall Limited, 11, Henrietta Street, W.C.2. 8¾ in. × 5½ in. × 1¼ in. 319 pp. Illustrated. Price 18s. net.—It is probably not wide of the mark to describe corrosion, with its insidious and unceasing attacks, as the railway engineer's "Enemy No. 1." In the civil engineering realm the inroads of corrosion are chiefly on steel structures and steel rails—in the latter case particularly in tunnels—while the locomotive engineer has to face the effect of corrosion on boilers and other locomotive parts, with the aggravation of the trouble brought about by high temperatures. Not only does corrosion cause loss of metal and attrition of strength, but it brings in its train corrosion fatigue, which may result in fractures, with dangerous consequences. Until recent years all too little attention has been paid to the corrosion problem, but considerable leeway has been made up since 1928 by the combined Corrosion Committee of the Iron & Steel Institute and the British Iron & Steel Federation, which was set up in that year, and has since published five reports. The book under review is a general survey of ten years' work by this committee, and correlates the results of tests made at fourteen corrosion stations in various parts of the world, half of them overseas, where atmospheric corrosion of structural steels, and ingot and wrought irons, together with the effect of such alloying elements as copper, and also of different methods of protective painting, have been closely studied. Marine corrosion has been investigated by observation of steel shell plates built into actual ships.

Other aspects of the subject covered are the high-temperature oxidation of iron and steel, the effect of rolling scale on the production of rust, atmospheric corrosion of wires and steel sleepers and soil corrosion. The matter is clearly and concisely set out, and the value of this compendium is increased by the exceptionally detailed index.

THE SCRAP HEAP

N.U.R. GIVES FOUR AMBULANCES

The executive of the National Union of Railwaymen decided on September 13 to provide four ambulances for the British Red Cross Society, and a mobile canteen for the Forces.

* * *

REPLACING "RAILWAY WAR"

Some French generals judged in May, 1940, that the Germans could not make their main blow through the Ardennes, because there are few railways in that area. In fact the main German blow did fall there. The French were surprised, and their main line at Sedan and along the Meuse was broken—partly because they had not realised that "petrol war" had replaced "railway war."—*From "New Ways of War," by Tom Wintringham (Penguin Books,* 1940).

* * *

Ingenuity accounts for the names of many stations along the lines of the Canadian National Railways. Take the first two letters in each of these words: "Canadian Northern Railway" and you get Canora, which is in Saskatchewan. Cannor, B.C., is a similar construction. Bresaylor, Sask., owes its unique name to three settlers who went to it in the 80's from the Portage Plains—Bremner, Sayers, and Taylor. At one time there were two post offices close together in Saskatchewan known as Riverside and Boldenhurst. They were amalgamated and each wanted its own name preserved. The difference was split and today the community is known as Riverhurst. Alsask is near the Alberta-Saskatchewan boundary. Curiously enough, it is in the subdivision of Mantario, which is a combination of the names of Manitoba and Ontario. Ashern, Man., is a monument to a Mackenzie and Mann timekeeper named A. S. Hern; two settlers, A. Dunlop and W. E. Rea, gave their names to Dunrea, Man.; two real estate agents, Langdon and Ruth, got together in Langruth, Man.; and Hemaruka is a compound of Helen, Margaret, Ruth, and Kathleen, daughters of a former vice-president of the railway.

* * *

110 YEARS AGO

On May 24, 1830, the first regularly-scheduled railroad passenger service in America began with the running of a "brigade" of horse-drawn cars on the Baltimore & Ohio Railroad. The Baltimore newspaper announcement was as follows:—

OFFICE OF THE BALTIMORE AND OHIO RAILROAD.
20th May, 1830.

NOTICE IS HEREBY GIVEN, That the Railroad between Baltimore and Ellicott's Mills will be opened for the transportation of passengers, on MONDAY, the 24th instant.

A brigade, or train of coaches, will leave the Company's Depot on Pratt-street, and return, making three trips each day—starting at the following hours precisely, viz.:—

Leave Baltimore at 7 A.M. and Ellicott's at 9 A.M.
Leave Baltimore at 11 A.M. and Ellicott's at 1 P.M.
Leave Baltimore at 4 P.M. and Ellicott's at 6 P.M.

The price for the trip of twenty-six miles will be seventy-five cents for each person. Tickets to be had at the Depot. Should the demand be found to exceed the present means of accommodation, passengers will be under the necessity of going and returning in the same coach, until a sufficient additional number of carriages can be furnished. As soon as this can be effected, of which due notice will be given, provision will be made for travelling a shorter distance than the whole trip.

P. E. THOMAS, President
Baltimore and Ohio Railroad Company

The track of the 13-mile stretch from Baltimore to Ellicott's Mills consisted of wooden cross members, like conventional modern railway sleepers, across which were laid long wooden stringers which carried the thin metal rail strips on which the cars ran. Horses hauled the cars until Peter Cooper came along with his *Tom Thumb* locomotive on August 25, 1830, and raced a horse-drawn car. Although the horse won because of an accident to the blower on the locomotive, *Tom Thumb* ran rings around the horse for most of the race and established the supremacy of the "iron horse"

* * *

THE RAILWAYMEN CARRY ON

"You should have seen him," said the little man. "I was on Home Guard all night round the railway station. I saw him. He went on shunting for four hours. I reckon they dropped about 60 bombs round about him. He just went on shunting trucks. And every time they dropped a packet—they all missed him—he just pulled the engine whistle: "Peep-peep!"—*From the "News-Chronicle."*

XUM

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

SOUTH AFRICA

Base Mineral Industry

Recommendations for the exploitation and development of the Union's base mineral industry are contained in the report of the committee, appointed in 1937 to enquire into the base mineral industry of the Union. On the subject of transport, the committee recommends that when the Government is considering a proposal for the construction of a railway or railway extension to serve the exploitation of base minerals, account should be taken of all benefits—not only to the community at large but also to that portion of it most directly affected—that are likely to result from acceptance of the proposition. Also that the Ministers of Mines and of Commerce and Industries should participate in negotiation with the mining companies concerned, and that no arrangement should be countenanced in which the obligation of the State to assist the industry by the provision of railway facilities would rest wholly on the shoulders of the railway administration.

It is further recommended that the proposed Mineral Development Section of the Mines Department, in consultation with the reconstituted Standing Base Mineral Committee, should supply authoritative and impartial information to the railway administration when applications are made by base mineral producers or exporters concerning railway rates and facilities.

EIRE

Dublin Market Cattle Traffic

The Dublin Corporation has suggested that Dublin cattle market should in future be held on Wednesdays instead of on Thursdays as at present. The reasons given are (1) that there is great congestion at the abattoir on Thursdays, when fully half the week's cattle is slaughtered, and (2) that Wednesday would be more suitable for English purchasers, as it would enable cattle to be slaughtered in England in time for week-end trade.

The railways, however, are opposed to the suggested change, because the various cattle fairs up and down the country on Tuesdays absorb so much of their rolling stock, and during the busy seasons upwards of 600 wagons are required each week to bring cattle into Dublin market by the Great Southern Railways alone—and traffic over the Great Northern line is also heavy—mostly on the day before market day. By transferring the stock by night, it is possible to serve the fairs on Tuesdays and carry cattle to Dublin on Wednesdays for Thursday's market, but to cater for the market on Wednesdays would be almost impossible without a great increase in rolling stock. All stock has of course to be cleaned and disinfected between journeys, and for this reason and because much of the traffic is over long distances, the total number of vehicles possessed by each railway cannot be taken as the maximum number available on any one day. The cattle trade is also understood to be opposing the change.

ARGENTINA

Lower Export Trade Figures

The serious injury sustained by the Argentine export trade through the loss, owing to the war, of what were formerly lucrative European markets is clearly shown by the official returns for the first six months of the current year. According to these figures, the tonnage exported during the half year, January to June, amounted to 6,405,056 tons, as compared with 6,715,883 tons in the corresponding period of 1939, a decrease of 310,887 tons or 4·6 per cent. This decline is chiefly due to the heavy drop in grain shipments, as although oats, barley, and rye all compared favourably with the corresponding tonnage figures of 1939, the reverse is the case with wheat (38,000 tons, or 1·6 per cent. less), maize (306,000 tons, or 18·3 per cent.) and linseed (142,000 tons, or 18·9 per cent.).

The progressive decline in the country's export trade is most clearly indicated by the figures for June, when the total tonnage amounted to 853,000 tons, representing a value of 119,000,000 pesos. In comparison with the preceding month, these figures show a reduction of 259,000 tons and 24,000,000 pesos, respectively; but as compared with the corresponding month of 1939, the drop amounts to 716,000 tons and 39,000,000 pesos. In June, wheat exports alone were maintained at a satisfactory level, and maize shipments, despite the enormous exportable surplus—estimated at over seven million tons—amounted to only 142,425 tons, or less than half the total for May, and less than one-third of that for June, 1939. The total tonnage of grain, linseed, and by-products exported during the month of June this year was only 667,046 tons, as compared with 1,338,366 tons in the corresponding month of 1939, a decline of 671,320 tons, or over 50 per cent.

Fruit exports, which had become a valuable item of Argentina's foreign trade, have also dropped by nearly 50 per cent., partly owing to damage caused by unfavourable weather conditions, and partly as the result of the closure of several important European markets.

Increased Meat Exports

Meat exports have so far been maintained at a high level, some 350,000 tons having been shipped during the six months under review, an increase of 13,000 tons as compared with the corresponding period of 1939. But present indications point to a possible decrease in exports under this head in the near future, owing to the fact that supplies are no longer required for the French Army; unless the wholesale destruction or confiscation of livestock in the countries which have suffered by German invasion create fresh demands for Argentine meat.

Decline in Railway Receipts

The decline in the Argentine export trade is reflected in the disappointingly poor earnings recorded by nearly all the railways at the end of the financial year 1939-40. A disastrous wheat harvest in conjunction with a huge maize crop for which there is no available market has deprived the companies of two of their most important sources of revenue. On the other hand, the enormous increase in the cost of fuel is another adverse factor which, far from being alleviated in the near future, seems likely to be accentuated, thus adding to the difficulties of the already heavily-burdened companies during 1940-41, the outlook for which is very far from propitious.

As compared with the previous period, three of the broad gauge lines finished up at the end of June last with heavy deficits, the Central Argentine being in much the worst position with a drop of nearly 12,000,000 pesos; the B.A.G.S.R. had a loss on the year's working of $572,000, the B.A.P.R. one of $3,871,000; but the B.A.W.R. had an increase of $1,482,000.

The extremely unfavourable situation indicated by the foregoing figures is made still worse when it is remembered that the year 1938-39, with which they are compared, was not by any means a particularly prosperous one, the B.A.G.S.R. having a deficit on the year's working of some 4,000,000 pesos; the other three broad gauge lines just managed to emerge on the credit side, thanks mainly to the bumper wheat crop with which that year was favoured. In view of the fact, however, that 1937-38 was such a bad year for all four companies from the revenue-earning standpoint, any comparison between it and the one just ended is liable to be fallacious and misleading. If, however, a comparison be made with 1936-37, a period which, although relatively high from the viewpoint of general revenue, was, if anything, below rather than above the 1927-38 decennial average of earnings, the aggregate loss on working sustained by all four companies is not far short of 60,000,000 pesos.

Maize Crop Estimate Reduced

A reduction of 388,000 tons, equivalent to 3·5 per cent., is indicated by the latest estimate of this year's maize crop, issued by the Ministry of Agriculture, which now puts production at 10,640,000 tons. This reduction is officially attributed to the fact that, owing to the very low prices ruling, a considerable area will not be harvested but utilised for pasturage.

ELECTRIC TRACTION SECTION

Transfer of Norwegian Electric Locomotives

IN our last Electric Railway Traction Section we recorded the transfer by the Norwegian State Railways of two of their large double electric locomotives from the Narvik line to Oslo. These locomotives were specially designed for hauling the heavy iron-ore trains over the Norwegian section of the Lapland Iron-Ore Railway, which provides access from the Swedish iron-ore mines to the ice-free Atlantic port of Narvik. In accordance with the system of electrification introduced by the Swedish State Railways on this line, these Norwegian locomotives were built to operate at 16,000 volts and 15 cycles, whereas the system adopted as standard for other Norwegian electric railways was 15,000 volts and $16\frac{2}{3}$ cycles. The question has been put to us whether there would be a loss of efficiency in the working of these locomotives in the Oslo region, in view of the slightly different system, unless some alteration had been made to adapt them to the changed conditions. Although we have no first hand information, it is unlikely that any alterations would have been made. For one reason, the Narvik locomotives were designed to exert a horsepower of 3,600, and, even divided into two separate units, as we understand they have been for operating on the Oslo lines, that still gives them each a nominal 1,800 h.p., which should be ample for the sort of service they are likely to be called upon to undertake, so that any slight loss of efficiency might be neglected in practice. The commutation of the motors would not be quite so good on the $16\frac{2}{3}$ cycle system as on the 15, but the difference would be small. With regard to the change in voltage, there is really nothing in this, because the figures used represent merely nominal voltages, and give no indication of the voltage drop and regulation, which must vary with local conditions, and may be quite considerable.

An Epitome of Experimental Electrification

THE electrified line of the late Midland Railway between Lancaster, Morecambe, and Heysham was, like the Holcombe Brook branch of the Lancashire & Yorkshire Railway, an experimental installation, and hence it need cause no surprise that its position is geographically anomalous compared with lines electrified for more commonplace practical purposes. Several small details reveal the reasons for the choice of this line as a trial of single-phase operation, of which it is the only example still working in Britain. One reason was that, with its exposure to the salt sea spray at Heysham, it offered technical problems of insulation upon which information was particularly required; indeed, it was claimed that within this short branch were to be found representatives of all problems associated with electric traction, with the sole exception that there was no tunnel. There were several steep gradients on the line, and the service between Lancaster and Morecambe could provide some similarity to intensive suburban conditions, especially at holiday peak periods. The traffic was highly competitive, as the line was paralleled by the Morecambe branch of the L.N.W.R. The conversion was inseparably linked with the development of the dock enterprise at Heysham, which provided the only maritime outlet of the Midland Railway over its own lines, and formed the logical port for the traffic of the West Riding, coming through the gap formed by the Craven Faults. The port is mainly a packet station for Ireland, but the Midland Company probably had greater aspirations here, which were not realised. Once the line was electrified, the company could segregate the local from the through traffic, and enable main-line boat trains to depart more quickly and to run non-stop through Lancaster—an important factor in the heavy summer traffic. More frequent workmen's service to Heysham could also be run if necessary, thus saving the expense of providing housing accommodation there, as was done by the Great Central in its development of the port of Immingham by building an electric light railway from Grimsby to transport workmen. Cheap power was obtained from an already existing power station belonging to the railway at Heysham, which was easily extended—an important consideration for a purely experimental line. Finally, there may be seen in the choice of system the Midland Company's hopes that it might one day electrify its main lines, particularly the hard-running stretch through the Pennines to Carlisle, in which event the Morecambe branch could be easily linked with the more comprehensive scheme. Today, however, the branch remains isolated, not only in position, but in its system of operation, which is now obsolete for British working. It will be interesting to see if, when the equipment requires considerable renewal, this line, having performed its original pioneer work, will meet a fate similar to that of the Newport—Shildon line.

Reversion of Electrified Line to Steam

THE Newport—Shildon line of the former North Eastern Railway runs from Shildon, an assembly point for the Durham coal traffic near Bishop Auckland, to the Erimus sidings at Newport, the distributing centre for the Middlesbrough industrial area, and was the original experimental 1,500-volt d.c. system, now the generally accepted standard for main-line work. The unique feature of the installation was that it was on account of the dense freight traffic that it was carried out, and the few passenger trains remained steam-hauled. Mineral traffic between the coal mines and the iron works reached such proportions during the 1914-19 war that it was profitable to the railway to adopt electric traction, which it did after 1915. The North Eastern was at that time the greatest mineral-carrying line in the country, and was therefore particularly interested in such a development, since a mineral line, once electrified and provided with a sufficient traffic, can prove even more profitable than a passenger-carrying line. Current consumption can be evenly spread over the whole twenty-four hours, and is not liable to sudden peaks, and hence idle equipment is reduced to a minimum and power costs are less. Power was further cheapened by being bought in bulk from public supply companies (the North Eastern was the first company not to construct its own power stations—a principle now universal for new extensions), who were generating electricity from the waste gases of the local blast furnaces. Further economy came about since the gradient all the way was in favour of the load, and the electric locomotives thus consumed a minimum of current when descending, whereas steam locomotives continue to burn coal whether steam is shut off or not, or whether they are stationary or moving. Electric locomotives consume no energy at all when standing, and since, compared with a passenger locomotive, a freight locomotive has a much larger proportion of its time spent in idleness, this is another important item in the economy of the electrified mineral line. Though the carrying capacity of the line was materially increased, it was found that five electric locomotives were sufficient to perform work formerly done by 13 steam engines. The decline of heavy industry and of the coal export trade after the war is well known, and in the general depression many of the collieries supplying this line became uneconomical to work and were closed; and with the decreased demand of the Middlesbrough area, the former heavy mineral traffic shrank until it was no longer profitable to work by electricity. Nevertheless, the equipment was still there to be used, so that there was no change in status until 1935, when considerable expense was necessary to renew the overhead conductors. But the traffic no longer justified this expense, so that the line reverted to steam traction, and the electrical equipment was removed.

XUM

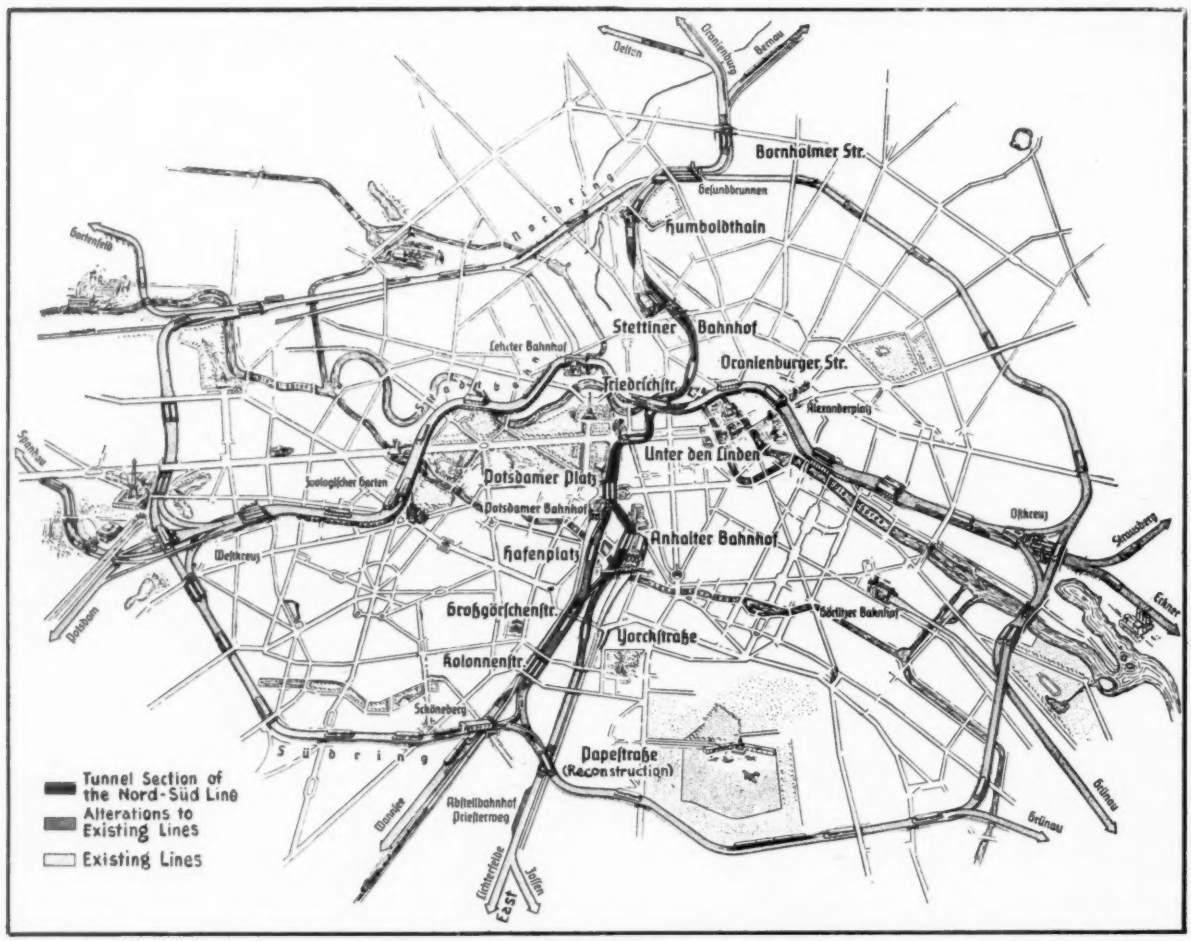
COMPLETION OF THE BERLIN NORD—SÜDBAHN—I

The opening on October 8, 1939, of the southern half of the North-South underground line in Berlin completed a route giving facilities across the city from north to south, generally similar to those available for local train services from east to west since the completion of the City line in 1882

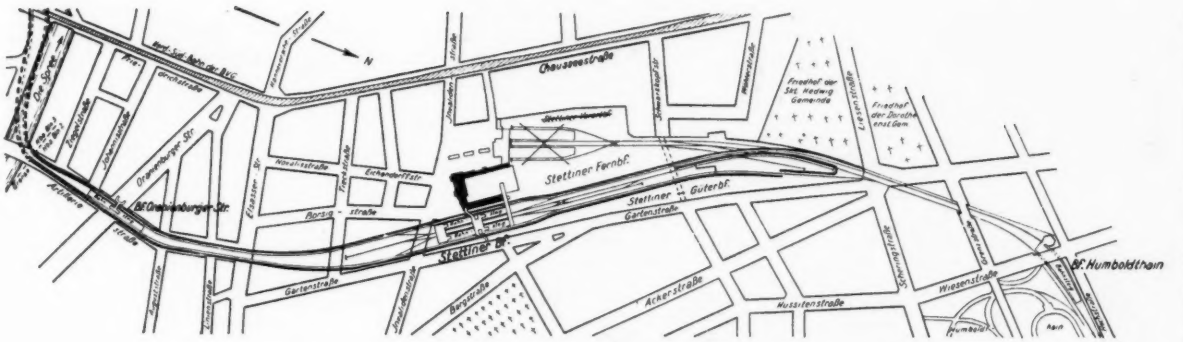
THE former Prussian Government, in association with the Berlin municipal authorities, was early occupied with the problem of improving the railway facilities in and around the city of Berlin, where the various main lines, constructed by private enterprise, had separate termini. In 1877 the circular or Ringbahn route was completed round the city, approximating in principle to the London Inner Circle scheme; and in 1882 the east to west cross route, the overhead City Railway, or Stadtbahn, was opened, which, with the connecting outer suburban routes linked thereto, provided very convenient and popular services, the traffic of which rapidly grew. Main line trains also ran over the City Railway. The provision of a similar north to south route was often mooted, but the difficulties and cost of providing the same type of viaduct construction through thickly built-up districts were too great, and an underground line was at first thought by many to be impracticable in the prevailing sandy waterbearing subsoil. Nevertheless several concrete proposals were made for one, with which leading electrical manufacturing concerns were associated.

The 1910 competition for the best scheme for improving the city again directed attention to the problem. The want of some such facilities continued to be felt, however, and encouragement was given to the plan by the successful introduction of electric underground lines by the private Hoch- und Untergrundbahn concern (since merged in the Berlin Transport Company, the holdings in which are mainly municipal). The City Railway and connections were electrified in 1928, and the construction of a North-South line again considered. The Reich Government in 1933 finally decided to construct it. The proposal for the through running of main line services, although at one time considered, was abandoned, transit traffic of main line passengers through the city—that is those who go through immediately—especially from north to south, being small. The construction of a route for local services alone was therefore considered.

The plan adopted was to form a direct connection between the suburban lines from Velten, Oranienburg, and Bernau in the north and those from Zossen, Wannsee, and Lichterfelde Ost in the south, with electrification as far as Zossen, passing



Main-line railway plan of Berlin showing the new North-South (Nord-Süd) connecting railway between the Stettiner and Anhalter stations. The City Railway (Stadtbahn) between Spandau in the west and Ostkreuz in the east, and the Ring Railways (Nordring and Südring) are shown in relation to the various main-line termini



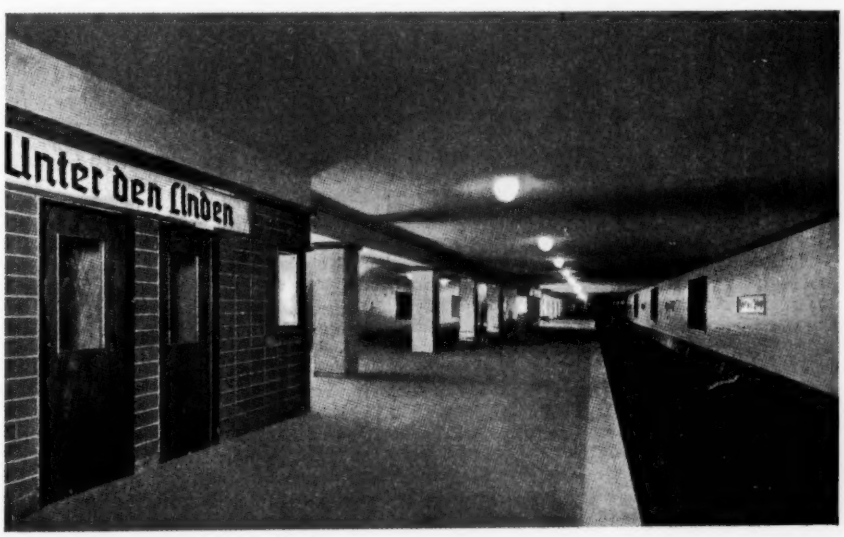
Above : Connection between surface and tunnel sections at the Stettiner station, showing the old local line terminal and the position of the main-line terminal (Fernbahnhof)

Left : Exterior of the Humboldthain station (shown on the above plan) which is situated on the northern part of the North-South line. It is characteristic of modern German urban station architecture, and in the foreground will be seen the distinctive symbol of the Berlin City Railways, which comprise both the Stadtbahn and the Nord-Südbahn

under the western end of the principal business quarter, with an interchange station with the City line at Friedrichstrasse and new underground stations at the Stettiner, Potsdamer Platz, and Anhalter stations, at the Unter den Linden, and a few other places, as seen on the accompanying map. The Anhalter station is on a loop in the route, the exact course of which was settled only after considerable discussion between the Government and the city authorities, who wished to avoid harm being done to the existing or projected routes of the municipal underground railway. It was not originally intended, for example, to pass under the Unter den Linden.

The northern half of the route is the simpler. It begins with a deviation and incline, leading to the tunnel section, just north of the existing Stettiner main line terminus, into which the northern suburban services previously ran, and continues as an ordinary double line, *via* the Friedrichstrasse and Unter den Linden stations to the new underground station at Potsdamer Platz (north of which there are reversing sidings), passing skew-wise under the River Spree on the way. This section was completed first and opened for traffic as far as Unter den Linden on July 28, 1936, the work being specially accelerated in order to clear that important thoroughfare of all engineering obstacles in time for the Olympic Games.

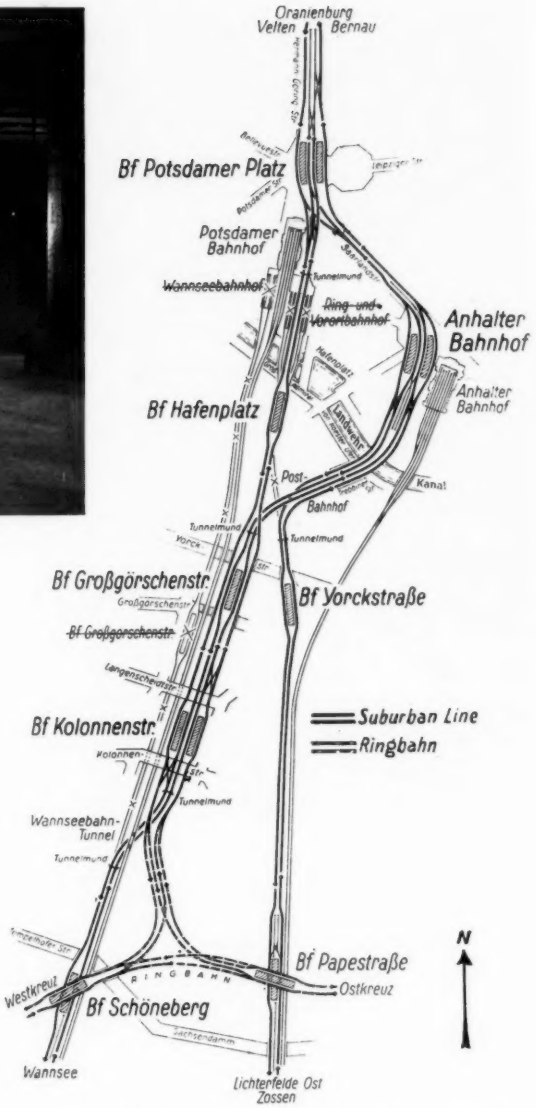
The southern section involved much greater difficulties, owing to the way in which the Wannsee, Zossen-Lichterfelde,



Right : Platform view of the Unter den Linden underground station on the new North-South line, which is typical of modern Berlin underground stations. It was opened on July 28, 1936, and for more than three years was the temporary terminus of this railway

XUM

Above: Completed tunnels near the Anhalter station before track-laying. The track is of standard ballasted construction, with flat-bottom rails and wooden sleepers



Right: Connections at south end showing positions of new underground stations at Potsdamer Platz and the Anhalter Bahnhof in relation to the main-line termini

and Ring lines approached the Potsdamer terminus, where they were accommodated in separate stations, one on each side of the main line terminus. It was at first suggested that the Ring trains, which had for years run into the terminus, should in future omit it, and form a purely circular service, but this would have necessitated large numbers of passengers changing at Papestrasse or Schöneberg. It was finally decided to project the Ring terminal lines down into the new Potsdamer Platz underground station (giving an emergency connection with the new projection of the Wannsee and Lichterfelde-Zossen lines which make a detour by the Anhalter station), and to provide them with a new station, Hafenplatz, just south of the Landwehr canal, to serve streets inconvenienced by the abolition of the old Potsdamer Ring line station.

The Wannsee line has been diverted to the east, passing below the Potsdam main line to form a four-track interchange station with the Ring lines at Kolonnenstrasse. The four tracks then continue parallel with the main line through another new station, Grossgörschenstrasse (not serving the Ring lines), and turn again eastward below the up Ring line and the down Lichterfelde line to reach the four-track underground Anhalter station, which has reversing sidings at each end. There are only two tracks onward except through Potsdamer Platz station where the Ring lines come in. The Lichterfelde line leaves its old route a little to the north of Yorckstrasse station. Scissor crossings at several stations permit of a very flexible use of tracks.

(To be continued)

"Crompton's Electric Railway," Southend

FROM the transport viewpoint the chief interest in Southend Pier, which was closed on August 31 as a war measure, is the tramway which traverses its length. The pier was purchased in May, 1875, for £12,000 by the Southend Local Board, and in 1876 a horse-drawn tramway was inaugurated along it; this ran through the large entertainment tent half-way along the pier, to the diversion of those who attended concerts therein. Works taken in hand in the late 'eighties resulted virtually in the complete reconstruction of the pier; and in August, 1890, the tramway was converted to electric traction by the late Colonel R. E. B. Crompton's firm, and was known as "Crompton's Electric Railway." It had, even as now, open-sided cars, collecting energy from a third rail. The cars then were run singly and the car motor was of 13½ b.h.p.; the pressure of the supply was 200 volts. The efficiency of the motor was approximately 85 per cent. without gearing; it weighed 89 lb. per b.h.p., which is weighty compared with modern motors. The motor speed was between 500 and 600 r.p.m., giving a train speed of 20 m.p.h. The motors were carried on the axle at one end and on springs at the other, thus allowing ample freedom for taking up any jar which might occur when running. The current was at first conducted by bare copper strip laid between the 3 ft. 6 in.-gauge Vignoles rails. The cars seated 32 passengers and could be driven from either end. The financial results were good, and orders were placed with Cromptons for additional equipment, and by 1894, there were three trains of three cars each in service. In 1927 powers were obtained to double the track and introduce automatic signalling arrangements, and also to build a new arm at the pierhead, 1½ miles from the shore; the extension was opened by Prince George, now Duke of Kent, in July, 1929. In peacetime some 3,000,000 persons used the pier every year, of whom 2,000,000 used the tramway.

PLASTICS FOR RAILWAY PURPOSES

A review of the physical properties of plastics and their various applications on railways for bearings, gears, decorative, and other utilitarian purposes

By JOHN S. TREVOR

THE most important plastic materials for railway coaches are laminated sheets and veneers, impregnated and compressed woods, shock-resisting phenolic resins and vinyl and acrylic resins. This brief list comprises only those plastics at present finding worthwhile applications which give promise of development in the future.

Laminated plastic sheet is made up of layers of fabric or paper thoroughly impregnated with an alcoholic solution of synthetic resin and then compressed in powerful hydraulic presses under heat. The finished product is hard and exceptionally strong. It is unaffected by temperatures up to 230° F., completely waterproof, oilproof and highly resistant to acids, alkalies, and solvents of all kinds. Although laminated sheet has a specific gravity varying from about 1·32 to 1·80, compared with 7·60 to 7·80 for steel, it is as strong, for equal weights of cross section, as structural steel. For equal strength, it is considerably lighter than aluminium and is much harder and stronger than wood, even lignum vitæ. The tensile strength of laminated sheet varies from 7,000 to 12,500 lb. per sq. in., flexural strength 15,000 to 21,000 lb. per sq. in., compressive strength 32,000 to 38,000 lb. per sq. in., and moisture absorption 0·4 to 2·0 in 24 hours.

Summarised quite briefly the above are the main physical properties of the material. These properties vary a good deal according to the nature of the filler. Thus paper gives a product which machines readily and possesses high electrical properties. Canvas is chosen where exceptional structural strength is the first essential, and linen where strength combined with accurate machining are the main essentials.

Self-lubricating Bearings

The most interesting application so far found for laminated sheet, which is generally available in varying thicknesses from 0·015 in., is for bearings of various kinds, including axle bearings. These are self-lubricating and wear evenly under extremely bad conditions of service. Even when dry, laminated bearings have a very low coefficient of friction against steel, although, being poor conductors of heat, they work best when water lubricated, the water serving a dual purpose of lubricating and carrying away the heat.

Some types of laminated bearings are impregnated with graphite, which remains throughout the natural life of the bearings. The presence of graphite is particularly useful in cases where water lubrication is not possible and the bearings are neglected through being inaccessible. It is claimed that the average lifetime of laminated bearings is four to eight times that of lignum vitæ and about four times that of bronze or white metal. Contrary to expectation, however, the plastic bearing is two or three times as expensive as a corresponding metal one; but even on this basis it is a good deal more economical in use for many industrial purposes.

Apart from laminated sheet material, round rods, hollow round tubes, rectangular tubes, angles and channels and laminated covered metal bars are all available. The material may be sawn, cut, turned, milled, stamped and polished in the same way as metal, provided that very sharp high grade steel tools (preferably tungsten steel) working at high speed are employed. German engineering shops using Novotext, the well known A.E.G. product extensively used for axle bearings, are recommended to employ the following speeds:—

Sawing with band saws, 25-30 m. per sec.

Turning, cutting speed 0·85 m. per sec. with a feed of from 0·3 to 0·5 mm.

Drilling, cutting speed 0·5 m. per sec. for holes from 10 to 60 mm. diam. with a feed of 0·2 to 0·4 mm.

German *Ersatz* axle bearings are frequently machined from wound tube instead of the thick sheet or block, as it is claimed that a better wearing surface is obtained. Two types of fillers are used, canvas or similar fabric and woven asbestos, the latter being preferred owing to its ability to resist the effects of high temperature invariably set up by inadequate cooling and lubrication. The failure of certain *Ersatz* bearings in use on German rolling stock is attributed by experts to several causes:—

1. Increase of load, especially when the bearings are new.
2. Faulty or insufficient lubrication and cooling.
3. Unfavourable operating conditions.

It has been suggested that the failure of bearings, particularly new ones, under heavy load, is due to the local pressing out of uncured resin, which causes distortion and eventual seizure. An increase of only 27·5 lb. per sq. in. is sufficient to cause "blocking," but it is pointed out by more than one writer that when the bearing is run-in, that is, when it has been in service a week or so, the load may be increased three or four times this amount without fear of a breakdown. The fact must, however, be stressed that plastic bearings vary considerably in their ability to stand up to overload. Standardisation cannot be completely assured in the same way as for metal owing to the great difficulty of ensuring that the resin is completely cured or polymerised. Various types of resin are being used in Germany, preference being given to cresol and mixed phenol and cresol resins.

Apart from the use of laminated material for bearings, it is also recommended for silent gears and pinions which are generally machined from blanks instead of being cut direct from a solid block. Unlike previous "non-metallic" gears, the modern laminated ones are able to stand up to sudden impacts or shock loads better than metal, and when properly installed they outwear cast iron or bronze. Being exceptionally strong, the plastic gears need no end-plates or shrouds to reinforce them.

The great advantages claimed for laminated gears, apart from silence, are high resistance to corrosion, resilience and ability to withstand to withstand sudden shocks and overloads. Owing to the low specific gravity (1·34) of the laminated material, high peripheral velocities can be used, and when properly installed velocities up to 7,500 ft. per min. are safe. These are figures quoted for the laminated material produced by Bakelite Limited. So far the author has not heard of any important use for laminated gears in railway construction, but there seems no reason why they should not be used for special applications where metal gears lack resilience and ability to withstand overloads.

Electrical, Decorative, and Utilitarian Uses

For electrical applications requiring an inert, strong material possessing an extremely low moisture absorption and high dielectric strength, a paper base laminated sheet, rod or tube is extensively used. It has been stated more than once that laminated material is the equivalent of a metal that is non-magnetic and an insulator. Indeed, it has to a large extent the high mechanical strength of a metal, and is therefore particularly suitable for those electrical uses where mechanical and structural strength are necessary requirements. Apart from the use of laminated sheet material for switchboards and control panels of all kinds, it is being extensively used for carbon circuitbreakers, linestarters and contactors, oil-immersed control panels and contactor bases, drum controllers, brush riggers, and armature coil supports, to catalogue but a few of the electrical uses of possible interest to the railway engineer.

Turning from electrical to decorative and utilitarian applications, one of the most important uses so far found for laminated veneers was in the fitting up of the Coronation Scot train of the L.M.S.R. shown at the New York World's Fair (and described in THE RAILWAY GAZETTE of January 13, 1939, pp. 51-58). Bakelite veneers were lavishly employed for surfacing the walls of the kitchen car and also the lounge car,

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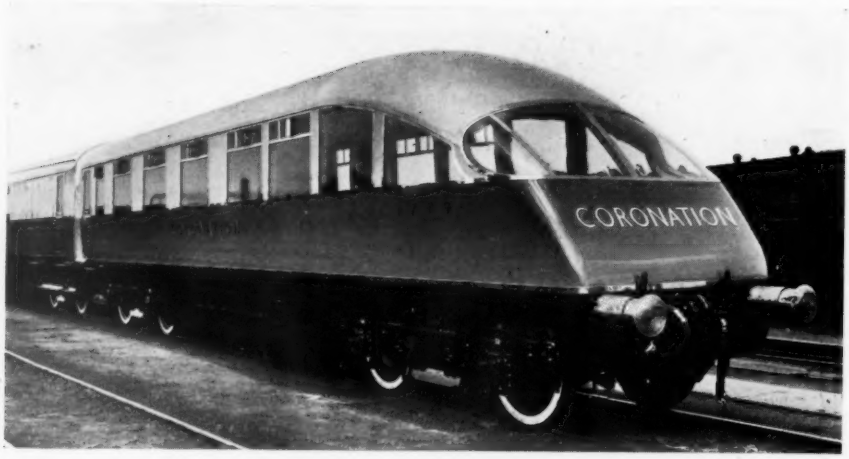
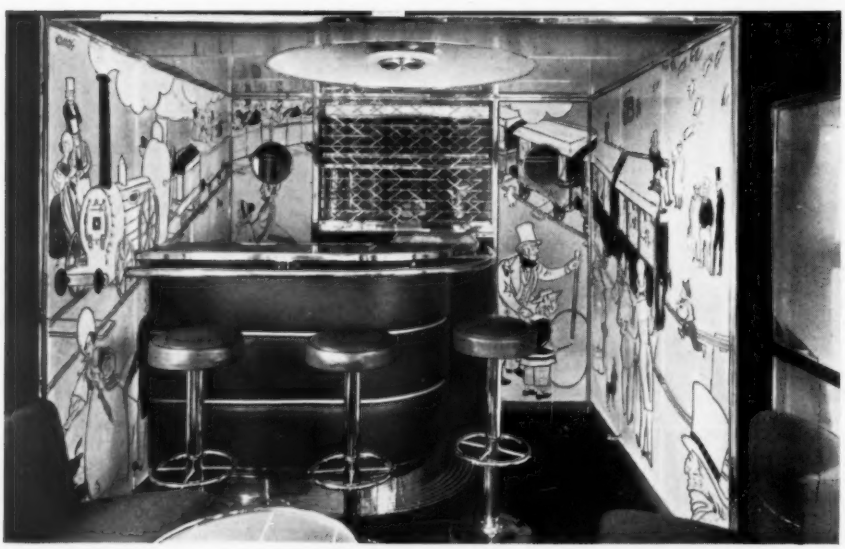


Beaver-tail observation car of L.N.E.R. Coronation streamlined train with Perspex windows

First class restaurant car of L.N.E.R. Flying Scotsman, showing Perspex transparent panelling above seats



Panelling of cocktail bar in the Coronation Scot of the L.M.S.R. Warsite veneer is used for the panelling and Bakelite veneer for the table tops

and a number of table tops were also finished in plastic veneers inlaid with designs in blue and white strips.

The veneers are available in a wide variety of colours, and it is possible to make use of fabrics for the top layer of the veneer and even original drawings, paintings, and photographs, all of which, when impregnated with a colourless urea resin, and cured under high pressure, are completely impervious to moisture and able to withstand all practical conditions of service. In the cocktail bar of the Coronation Scot there are some particularly fine examples of pictorial plastic veneers on which early railway history of the iron horse is graphically and humorously depicted.

There is a considerable future for these veneers in the fitting-up of coaches, as all kinds of rich effects are possible, and some of the latest tapestry veneers are very beautiful. They can be further enhanced in appearance by means of coloured metal inlays made up in the form of geometrical or

Corridor view of kitchen car in L.M.S.R. Coronation Scot train showing Bakelite veneer finish

other designs. In America, railway coach builders are making generous use of plastic veneers, particularly Micarta and Formica, two of the best known proprietary brands, for wall surfacing bar counters and table tops.

Impregnated and compressed woods have been used in Germany and France for some years now, the best known German products being Lignofol and Lignostone, and the French materials, Durisol and Permali. They are made by treating properly seasoned beech and other wood veneers with an alcoholic solution of phenol formaldehyde resin, drying, and then pressing a number of the veneers together in a powerful hydraulic press so as to form a sheet of composite wood made up of resin impregnated layers. This is impregnated wood. Compressed wood is produced in a somewhat similar way, except that the veneers are not saturated with resin, but merely glued together under great pressure with either liquid resin or resin-treated absorbent paper, such as Tego Film or Plybond, the last named being a product of Bakelite Limited.

Impregnated wood is particularly valuable where a high resistance to moisture or chemical is required in addition to exceptional mechanical strength. Compressed wood is naturally lighter in weight than the impregnated type and has a higher impact strength. Both types of compound wood are very strong materials. Jicwood, a well known English product, has a tensile strength of 47,800 lb. per sq. in.

Durisol, a somewhat similar product to Jicwood, made in France by Cadoux of Beauchamp, one of the largest rolling stock manufacturers on the Continent, has been used for some time for carriage floors and sides, also lift floors and escalators. The high mechanical strength of these compound woods renders them particularly suitable for coach building where it is desired to use non-metallic materials of the highest possible strength and wear resisting properties. The unusually good tensile strength, shear strength and impact value indicate that the material is able to withstand a high resistance to shock and splintering caused by a rail accident. Incidentally, impregnated wood veneers are used for decorative wall panelling on the Netherlands Railways, and it is possible to obtain some very attractive effects by the use of different types of impregnated woods.

Impregnated wood is also used for insulated fishplates for track-circuited railway tracks, instead of the usual steel fishplates insulated with strips of fibre or other non-conductive materials. The wood used for this purpose is made up of veneers laid so that the actual fibres lie parallel and thus resemble real wood in structure. This particular type of compressed wood has a great resistance to traction and flexion and is well suited for the application. Experience in France, where a large number of such joints are in use with both bull-head and flat-bottom rails, has been very satisfactory, and fishplates in use for over four years, show no signs of breakdown.

Impregnated wood has also been used on the Continent for several other applications for signal insulation with conspicuous success. In the case of fishplates, the electrical properties of the material are not of such importance as its permanence, high mechanical strength and low moisture absorption properties. The most suitable material has a moisture absorption figure not higher than 1 per cent. in 24 hours' immersion in cold water.

Dealing now with ordinary mouldings of the phenol formaldehyde or Bakelite type, these have many obvious applications, such as ash trays and lamp fittings of various kinds, as well as numerous small electrical accessories. In the past, experience with these small mouldings has not always been unanimously successful, owing to their low resistance to shock. However, phenol formaldehyde resins differ considerably in properties according to the quality of resin used, type of filler and conditions of moulding.

Acrylic resins, better known as organic glasses of which Perspex, the transparent sheet material made by Imperial Chemical Industries Limited is the most important, has been used with considerable success for railway work. Interesting applications of Perspex are to be found in its use for the observation car in the L.N.E.R. Coronation train, and in the first class dining saloon of the Flying Scotsman. Here the light metal partitions separating the six-seat sections are panelled in $\frac{3}{16}$-in. sheets of Perspex, which, on account of its amazing clarity, enables an attendant to see the whole length of the car almost as easily as if no panelling were present. Perspex weighs less than half the weight of glass, and it is therefore very suitable for many applications where lightness in weight is an advantage. Coupled with a low specific gravity, Perspex is very strong, does not splinter and is even more transparent than glass. Sheets of the material can be drilled, sawn, and generally worked with comparative ease, using ordinary metal or wood working tools.

The future of plastics in railway construction appears to be very promising, as not only can existing materials find useful and sometimes important outlets, but the plastics themselves can often be improved or specially adapted to comply with special requirements. Plastics are available for applications of the most diverse nature, some of which need materials of high dielectric strength and low moisture absorption, whilst others demand good mechanical strength or possibly maximum resistance to chemical corrosion, oxidation, etc.

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British Railways and the War—37

Two views showing something of the accommodation for travelling Servicemen provided at Euston, L.M.S.R., by the Y.M.C.A.

In one of the arches of the lower level of Somers Town goods depot, members of the L.M.S.R. staff have equipped a first aid post. Above are two views of the interior of the post. All the work was performed voluntarily and in their own time by the men, from the cleaning out of the arch, which had been disused for many years, to the construction of the beds and much of the furniture from waste material and the distempering of the walls and ceiling. *The post is described at page 310*

RAILWAY NEWS SECTION

PERSONAL

G.W.R. Chairmanship

The directors of the Great Western Railway Company, at a special meeting held on September 12, unanimously elected Mr. Charles J. Hambro to be Chairman of the board in succession to the late Lord Horne of Slamannan. Mr. Hambro has been Joint Deputy Chairman of the company since 1934.

G.W.R. General Manager Elected a Director

Sir James Milne, who has been General Manager since 1929, was elected to a seat on the board to fill the vacancy caused by the death of Lord Horne. He will retain his position of General Manager.

The Anglo-Scottish Railways Assessment Authority reports that, as Mr. W. B. Keen and Mr. G. Stoughton Harris were unable (the former through ill-health and the latter through service with H.M. Forces) to continue as its Accountants, the authority has for the present engaged Mr. P. F. Carpenter, F.C.A., to act in their place.

Colonial Office Appointments

The following appointments are announced:—

Mr. J. C. Forgan, Assistant Engineer, to be Senior Assistant Engineer, Tanganyika Government Railways.

Mr. H. F. P. Plumridge, Administrative Assistant, Grade II, to be Administrative Assistant, Grade I, Nigerian Railway.

Colonel J. M. Greathead, M.C., Chief Civil Engineer, South African Railways & Harbours, has been appointed Engineer-in-Chief, Defence Headquarters, Pretoria.

Mr. Walter Barnes, F.S.I., who had been engaged since the constitution of the Railway Assessment Authority in the valuation work connected with the L.N.E.R. roll, has resigned to take up a permanent appointment elsewhere.

We regret to record the death of Mr. Andrew Reid, Joint Managing Director of the North British Locomotive Co. Ltd.

We regret to record the death, on September 17, of Mr. C. S. Louch, who was Comptroller & Accountant to the London Passenger Transport Board until his retirement on January 31, 1939.

Mr. Charles Jocelyn Hambro, who has been elected Chairman of the Great Western Railway Company, is the eldest son of Sir Eric Hambro. Mr. Hambro was born in London in 1897 and educated at Eton where he captained the cricket eleven in 1915. He served with the Coldstream Guards during the 1914-1919 war, and gained the Military Cross. After the war he entered the family business—Hambros Bank, of which he is now a Managing Director. Mr. Hambro joined the board of the Great Western Railway in 1930, and is Chairman of the G.W.R. Finance Committee. In November, 1932, he was appointed a Deputy Chairman of the Great Western Railway Company, in addition to Lord Palmer. This is in accordance with a practice which previously prevailed for many years. Mr. Hambro is also a Director of the Bank of England, of the Mercantile Bank of India, and the Hambro Trust Limited. He became a Sheriff of the County of London in 1933, and in December, 1936, was appointed a Lieutenant for the City of London.

Portrait by] [*Hay Wrightson, London*

Mr. Charles Jocelyn Hambro

Who has been elected Chairman of the Great Western Railway Company

New Chief Commissioner of Railways, India

Mr. L. Wilson, General Manager, Great Indian Peninsula Railway, has been appointed Chief Commissioner of Railways in India.

Indian Railway Staff Changes

Mr. G. E. Cuffe, Agent and General Manager of the Assam-Bengal Railway, has been appointed to succeed Mr. Wilson as General Manager, G.I.P.R.

Mr. R. G. Manson, Chief Operating Superintendent, A.-B. R., has been appointed Agent or General Manager of that railway in place of Mr. Cuffe.

Mr. B. C. L. Bean has been promoted permanently as Deputy Chief Operating Superintendent, N.W.R., whilst continuing to be employed as a Divisional Superintendent on that railway.

Mr. S. E. L. West, O.B.E., V.D., has been confirmed provisionally as Deputy Chief Operating Superintendent, N.W.R.

Mr. K. K. Sen has been appointed to officiate as Deputy Controller of Railway Accounts as from June 6.

Director-General of Engineering, Indian War Supply Board

Sir Guthrie Russell, Chief Commissioner of Railways, India, has been appointed Director-General of Engineering under the War Supply Board.

Sir Harold Colam, Secretary to the Electricity Department of the Mysore Government, and Chairman of the Traffic Board, has been appointed Agent & General Manager, Mysore State Railways, *vice* Mr. Y. K. Ramachandra Rao, granted leave preparatory to retirement.

Sir James Milne, who has been elected to a seat on the board of directors of the Great Western Railway Company, succeeded Sir Felix J. C. Pole as General Manager of the G.W.R. on July 8, 1929. Sir James joined the company's service as a pupil in the locomotive department in 1904, and, after passing through the Swindon shops, mechanical laboratory, and drawing office, transferred to Paddington. He had experience in various sections of the office of the Superintendent of the Line and afterwards in the General Manager's Office. In 1912, he returned to the office of the Superintendent of the Line, where he took charge of the passenger train

running department. In January, 1916, he was appointed Chief Clerk to the Divisional Superintendent at Pontypool Road, and was later for a short period Acting Divisional Superintendent at Swansea. His next position, in 1917, was that of Assistant Divisional Superintendent at Plymouth. In September, 1919, his services were requisitioned by the Minister of Transport under whom he held the office of Director of Statistics. Subsequently he was one of the two officers specially selected to assist the Committee on National Expenditure. On January 1, 1922, Mr. Milne was appointed Assistant to the General Manager, and in the following April became Principal Assistant. Later on, in the same year, he was selected by Lord Inchcape to assist the Indian Retrenchment Committee and was one of the co-signatories to the report of that committee. In April, 1923, Mr. Milne returned to Paddington and received the honour of the C.S.I. in the King's Birthday Honours of that year. In March, 1924, he was appointed Assistant General Manager, and in July, 1929, became General Manager. In January, 1932, the honour of Knighthood was conferred upon him, and in the New Year's Honours of 1936 he was created a K.C.V.O. Sir James is a graduate (B.Sc.) of Manchester University, an Associate Member of the Institution of Civil Engineers, and a Member of Council of the Institute of Transport.

Sir James Milne, K.C.V.O.
General Manager, Great Western Railway, who has been appointed a Director

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The Minister for Public Works & Communications in the newly-formed Roumanian Cabinet is Prof. Pompil Nicolau.

Mr. Theodore Charles, who has been Manager of W. H. Smith's bookstall at King's Cross station, L.N.E.R., is to retire next month. Mr. Charles has also been in charge of bookstalls at Southampton Terminus station, and at Dover Priory station, Southern Railway. Mr. R. C. Plummer, Manager of Victoria station bookstall, is to succeed Mr. Charles at King's Cross.

Notice is given in *The London Gazette* of September 17, 1940, that the partnership between Alfred William Burchell and Hedley Herbert Marshall carrying on business as Solicitors and Parliamentary Agents at 5, The Sanctuary, Westminster, S.W.1, under the style or firm of "Burchells" and "Lyne & Holman," has been dissolved by mutual consent as from September 14, 1940. The business will be carried on in the future by Mr. Alfred William Burchell.

Push-and-pull train on the Dunton Green—Westerham branch, Southern Railway, composed of 0-4-2 "D1" class tank locomotive No. 2355 of Stroudley design, and two ex-L.B.& S.C.R. bogie coaches with a driver's compartment at the far end. The train is equipped with the standard vacuum brake, and the other hose seen above the buffer beam is for the compressed air control to the driver's cabin when coaches are added on the other side of the locomotive. These branch trains may consist of either two or four coaches, and at the trailing end horse boxes or vans may be added

Photo.] *[H. C. Casserley*

TRANSPORT SERVICES AND THE WAR—56

Transport during air raids—River Thames passenger service—Transport in Europe—British civil aviation serves five continents—Berlin and Brussels bombed

Another week of continuous day and night air raids on the Metropolitan area has demonstrated that the powers of transport improvisation to which we referred last week were no mere flash in the pan but have proved themselves capable of daily—almost hourly—use as various sections of route have been closed to passenger traffic for longer or shorter periods until the authorities have improvised repairs or satisfied themselves that continued use will not be attended by undue risk.

Very close co-operation continues to exist between all forms of passenger transport and, in general, tickets are honoured by any reasonably practical route. On the road, trams and trolleybuses, by reason of their lack of mobility, have suffered relatively more severely than internal-combustion-engined vehicles. In some cases buses prominently labelled " tram " have maintained the whole or part of a tramway service temporarily suspended. In addition, shuttle services of buses and coaches have provided temporary links in interrupted chains of railway communication.

Transport During Air Raids

In order that production may not be impeded more than absolutely necessary during air raids, the Government has appealed to employers and workers in essential trades to carry on after the warning siren until it is clear that enemy attack is imminent, and to resume work when the immediate danger has passed without waiting for the public " raiders passed " signal. The general arrangements are referred to at page 315 in " Staff and Labour Matters." The Minister of Transport has communicated with the Transport & General Workers' Union, the Municipal Passenger Transport Association, the Omnibus Owners' Association, the Public Service Transport Association, Associated Road Operators Limited, the Commercial Motor Users' Association, the Scottish Commercial Motor Users' Association, the London Passenger Transport Board, and the Scottish Road Passenger Transport Association, on the position as it relates to road vehicles. He states he is aware that drivers and conductors of buses, trams, and trolleybuses in various parts of the country have been in some doubt as to what they should do when an air raid warning has been sounded. No such doubt need now exist, and the Minister is confident that those engaged in passenger transport, mindful that the maintenance of output is dependent on their services, will continue to carry passengers desiring to travel after the sirens have sounded, until there are definite indications that an actual attack in the vicinity is likely to take place.

River Passenger Service Between Woolwich and London

An interesting innovation has been the introduction from Friday last, September 13, of a passenger boat service between Woolwich and Westminster, calling at Brunswick for East India Dock, Greenwich, West India Dock, Tunnel (Wapping), Cherry Garden (Bermondsey), and Tower piers. The first boats left Woolwich and Westminster piers in each direction at 6.30 a.m., and also from Greenwich in each direction at 6.30 a.m. On the first day the boats used Woolwich South, but on September 14 the terminus was transferred to North Woolwich (L.N.E.R.) pier. On Friday and Saturday last 6 boats were in service and trips were made at 40-min. intervals. No service was operated on Sunday, September 15. On Monday, additional vessels were introduced and a 20-min. service was inaugurated. For the first few days the last boats left Westminster at 4.30 p.m. for Woolwich, and for Greenwich only and intermediate points at 5.10 and 5.50 p.m. The last boat left Woolwich for Westminster at 5.10 p.m., and to Greenwich only and intermediately at 5.50 p.m. The London Passenger Transport Board then announced that from September 18 the service would be at 30-min. intervals and that there would also be boats at 5, 5.15, and 5.30. The last boat from Westminster to Woolwich became 4.10 p.m., but later boats serve Greenwich up to 5.30 p.m. The last boat from Greenwich to Woolwich now leaves at 5.48 p.m. The single journey time is about 75 min.

Tickets are issued on the boats, but in addition railway seasons and bus or tram return tickets (including workmen's return tickets) are valid for the appropriate journey. The boats, which vary in seating capacity from 80 to 250, are supplied by Joseph Mears Limited, of Richmond, which also provides the navigating staff; the conductors are from the London Transport bus staff. The vessel which inaugurated the service was the *Beatrice*. Many of the craft have seen war service and at least two have shrapnel scars on their decks; some went to Dunkerque and others acted as hospital tenders.

Motorists Help Pedestrians

A few days ago motorists were reminded by the Ministry of Information of the appeal, issued to them some time earlier, to give lifts to pedestrians who are finding transport difficult owing to wartime conditions. It was pointed out that these difficulties tend to increase rather than to diminish. Those motorists who have not yet affixed to their windscreens notices to the effect that they are willing to assist pedestrians in this way, would be performing a public service by doing so. Many pedestrians are reluctant to ask for lifts, but the appearance of such a notice will encourage them to do so, and will thus help to keep the streets clear and, in many instances, to assist war workers to " go to it " without unnecessary delay. Our own observations lead us to the conclusion that in the central London area most motorists are helping willingly, and the police are stopping the " one-man " cars to ensure that the greatest possible use is made of available transport—whether private or public.

Evacuation of School Children

The Minister of Health has issued a reminder to parents in the crowded parts of London that registration of school children for evacuation is still open. Children who are registered will be moved quickly to districts where the population is more scattered. Mothers with children under 5 years of age who can make private arrangements to stay with friends in reception areas can get a voucher entitling them to travel to their destinations free of charge and a certificate which will enable the householder with whom they stay to draw weekly billeting allowances of 5s. for the mother and 3s. each for the children.

Rapid Repair of Air Raid Damage on L.N.E.R.

Many records for rapid repair work must have been broken by L.N.E.R. engineering staffs during the recent period of air raids on London. As many suburban passengers know, the L.N.E.R. has not escaped damage, but comparatively little dislocation of train services has so far occurred, mainly because of the expeditious way in which repairs have been effected. Recently a dozen bombs dropped on a station in the eastern suburbs one evening. Platform walls were damaged, the track lifted and rails bent, whilst there were bomb craters in various places. A train ran into the debris, thereby blocking two of the four sets of metals through the station. Less than twenty hours later the debris had been removed, the derailed train withdrawn, the platform walls and track repaired (the latter work requiring six new rails), and both lines re-opened to traffic in time for the evening rush hour. As a result, business persons who had seen the damage when travelling through the station over one of the undamaged sets of metals in the morning, were surprised to find on their

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return journey in the evening that their train passed over the place where the damage had occurred. Results such as these are being achieved by a ready perception of what is required so that repairs are carried out at various points simultaneously, by having the available men used to the best advantage, and by the enthusiasm of the men themselves. A contributory factor lies in the fact that the necessary materials for repairs have been readily available through preconceived arrangements.

Summer Time

The Secretary of State has given notice that summer time this year will end on the night of November 16-17, as provided by the Defence (Summer Time) Regulations, 1939. In Germany and German-occupied territories, summer time is to end during the night of October 5-6 and is announced to be resumed on March 15.

Railwaymen Save Ammunition Train

The Bronze Cross, the highest award of the Scout movement, has been given to Sub-ganger George Frederick Keen for his part in saving 45 out of 51 wagons of an ammunition train standing on a single-line railway in the South of England which was hit by an explosive bomb on the night of August 22. The incident was recorded at page 257 of our September 6 issue. Keen is a scoutmaster.

First Aid Post at Somers Town

Beneath the Somers Town (L.M.S.R.) goods depot, members of the railway staff have equipped a well-appointed first aid post. The interior of one of the arches on the lower level was put at the disposal of the men, who first cleared out an accumulation of waste and then converted the arch into an efficient post. They distempered the walls and ceilings, thoroughly cleaned the stone floor, and then set about making furniture. Four beds, as well as a screen, were made from old timber, and all painted in cheerful colours. The work was done by about half-a-dozen men who, in their spare time, effected the whole of the necessary work in little more than a week. The satchels for carrying first aid kit were made by wives of the men from aprons supplied by the company. The greatest enthusiasm has been displayed by the staff in ensuring the efficient furnishing and manning of the post and officers of the company who have inspected it have expressed their gratification with the good work which has been done. (*See illustrations on page* 306.)

Transport Charges on Feeding Stuffs

The Ministry of Food has now announced that a scheme came into operation on September 1, which will spread over the whole cost of imported feeding stuffs certain additional charges for transport of feeding stuffs which some farmers have hitherto had to meet. Under war conditions the diversion of ships to ports, other than the normal port for a particular area, is occasionally unavoidable, and hitherto individual farmers have had to pay the actual railway freight on imported feeding stuffs wherever they arrived. Under the diversion scheme the amount charged to the merchant on account of railway freight, and by him to the farmer, will be that from the usual major port of arrival. Any additional charge due to shipping diversions will be met from a trading pool. This arrangement should do much to eliminate a common complaint that keepers of livestock have had to pay different prices for the same commodity according to the port from which it was drawn.

Transport Subsidy for Home Grown Mining Timber

In connection with the transport subsidy scheme for home-grown mining timber, of which details were given at page 258 of our September 6 issue, the Ministry of Supply has now pointed out :—

(1) That the subsidy is payable only in approved cases and that the decision of the Minister of Supply as to whether the requirements are fulfilled, and as to the amount of the subsidy payable, in any case, is final ;

(2) That, in the case of mining timber consigned to collieries *via* importers' and merchants' yards or colliery associations' yards, the railway charge (and in appropriate cases sea transport costs) *to* the yards only will qualify for subsidy and that in such cases no subsidy will be payable on railway charges from the yards to the collieries. As in general timber is received by the yards from near and distant sources indiscriminately before selection and sorting, it would clearly not be practicable for consignments from the yards to the collieries to be identified for the purpose of determining whether a subsidy was payable ; and

(3) That, with regard to mining timber from Eire, for the time being the subsidy will not be payable on such timber if delivered to mines in the counties of Monmouth, Glamorgan, Pembroke, Carmarthen, or Brecon.

The Railways of Belgium

A report from Brussels, which has reached England *via* Berlin and New York, says that resumption of railway service on more than 600 route miles was announced on August 4 by the Belgian National Railways Company. This is almost exactly one fifth of the total system, the route mileage of which was 3,007 at the outbreak of war. As we recorded at page 286 of our September 13 issue, the German authorities have announced " nearly normal transport services on the Belgian railways " from October 1. According to the message received *via* New York, German engineers have repaired forty main bridges and Belgian railwaymen have rebuilt about 160 smaller ones that were destroyed or damaged in the hostilities. At the beginning of August about 110 remained to be repaired. The Belgian National Railways Company has stated that rolling stock is again becoming available, although many locomotives and wagons are still working in France.

Transport in France

The precise position about internal transport in both German-occupied and " unoccupied " France is still obscure, but it seems that rail services are sparse and irregular, and in the main are confined to the principal routes.

It was announced in Vichy on August 20 that all railway traffic between occupied and " unoccupied " zones of France had been suspended under German orders, but no reason was published. On the evening of that day, the French radio also announced that the repatriation by railway of refugees from Luxembourg and Belgium who were in the " unoccupied " part of France was being suspended for the time being. Neutral correspondents stated that there was reason to believe this measure had been taken because of intensive troop movements in various parts of German-occupied France. At the same time the demarcation line between occupied and " unoccupied " France was closed to all traffic—both rail and road between Tours and the Pyrenean frontier. A statement made by the Lyons radio said that up to that time approximately 1,600,000 refugees in " unoccupied " France, including 390,000 Belgians and Luxembourgers, had returned to their homes, a repatriation made possible by the operation of 30 special trains a day supplemented by road transport. The total awaiting repatriation was estimated at about 2,200,000 and the hope was expressed that those destined to travel by rail would all be home by November 15. It would seem that repatriation was resumed shortly afterwards, for on September 3 a report reached this country that 15 persons were killed and about 50 injured when a train conveying some 1,200 Dutch and Belgian refugees from France back to their own countries collided with a goods train on the Sambre line. It has since been announced that the last of the trains repatriating refugees from the Departments of Seine, Seine-et-Oise, Seine-et-Marne, Aube, Yonne, and Côte d'Or left Annecy on September 14. Travellers had to be possessed of certificates from the prefecture.

The plans of the Pétain Government for alleviating unemployment in German-occupied as well as " unoccupied " France were outlined in a statement issued after a cabinet meeting on September 10. The schemes include the construction and repair of railways and roads, the construction of drains and water conduits, and electrification projects. It is proposed to spend fr. 250,000,000 on schemes in German-occupied France and fr. 200,000,000 in the " unoccupied " zone.

Temporary bridges have been built over the Rivers Seine and Oise to replace 30 out of the 32 bridges which were destroyed as the Germans advanced, states a message from

the Havas Agency, dated September 14. The work of permanently reconstructing the bridges will take some years, but these temporary bridges are strong enough to take heavy loads.

The Havas Agency has also announced that 18 Metro stations (out of 97 closed) were reopened on September 2; that eleven Paris bus routes to the suburbs began running on August 31; and that the funicular railway up to the Church of Sacre Coeur (Montmartre) is also working again.

New Soviet-Finnish Railway Agreement

A new agreement concerning railway communication between the Soviet Union and Finland was signed in Moscow on September 6, according to an official announcement made in Moscow on September 15. It provides for direct passenger and freight traffic between the two countries, for transit traffic between Russia and Sweden *via* Finland, and for railway communication with the Hangö Peninsula leased to Russia under the Soviet-Finnish Peace Treaty.

Air Raid Shelters for New York

A proposal to build air raid shelters which can be converted into underground railway stations is being considered by the New York Transport Board. Every shelter would be constructed so that a series of them could be used as stations along the Second Avenue underground route, plans for which were prepared some years ago.

Troop Movements in the U.S.A.

The recent large-scale troop movements in the U.S.A. are said to have been the largest in that country since the last war, and to have involved a three-day peak traffic not equalled even at that time. The manœuvres in Wisconsin, in which participated National Guardsmen of five States, as well as Regular Army troops, required on the Pennsylvania Railroad the movement of 14 trains, with 187 cars, carrying 5,177 officers and men and their equipment, together with 210 animals in special cars. These trains were operated to Chicago by the Pennsylvania on August 11 and 12 from points in Pennsylvania, Indiana, Kentucky, and Ohio. From Chicago to the area of the manœuvres the trip was completed on western lines. The men concerned returned on August 31 and September 1. In the case of the Regular Army and National Guard movements to northern New York, completed in the second week of August, the Pennsylvania furnished 20 trains, with 348 cars, carrying a total of 8,247 officers and men with their equipment, and 558 animals in special cars. Soldiers participating in these manœuvres returned over the week-end of August 24 and 25. These troop movements have been spread over several days, with an interval of some weeks between arrival and departure, and the traffic, therefore, is much less concentrated than is the case with heavy civilian excursion movements where every individual is carried twice as a passenger during the same period, arriving and departing within a few hours. With troop movements, however, there is the necessity of keeping the military authorities at Washington and elsewhere informed constantly of the whereabouts of every train.

British Civil Aviation Serves Five Continents

At the beginning of the second year of war, the route miles flown by British civil aircraft are 94 per cent. of what they were in peacetime. With every swiftly-changing phase of the conflict, the services of the British Overseas Airways Corporation have had to be reorganised drastically, as recorded in these columns from time to time. However, despite the heavy calls made by the military authorities on civil pilots, crews, and aircraft, and despite the closing of the Mediterranean, new services have been introduced. Today the British Overseas Airways Corporation is the only civil aviation undertaking in the world to serve five continents. The most important event of the summer has been the resumption of the direct flights between England and North America. These flights have a great practical value and are also of considerable psychological importance. There is a wealth of evidence to show that the sight of an unarmed British flying-boat safely crossing the Atlantic has kindled American imagination, and every time the *Clare*, in her coat of camouflage, has landed at La Guardia airport, she has demonstrated British confidence and strength.

The great distances of the "horseshoe" route between Durban and Sydney—the main Empire service now operating —are being covered with regularity and lack of incident. This is the longest commercial air service in the world, and has recently been doubled in frequency, now running twice weekly in each direction. The connection from Sydney to Auckland which began only a few months ago, has also been increased, and the 1,500 miles across the Tasman Sea are now traversed thrice weekly. Moreover, a link between Bangkok and Hong Kong is maintained by landplane twice a week. Thus on the "horseshoe" alone, with its feeder services, no fewer than 37,000 miles are being covered, on average, every week by British aircraft. Contact betwen England and the Continent of Europe is maintained regularly by means of flying-boat and landplane services to Lisbon. These links are at present much more frequent than seemed possible a couple of months ago, and both mail and passengers (chiefly priority) are carried. British commercial aircraft are at present "showing the flag" in no fewer than 24 countries, Imperial and neutral, Allied and friendly.

European Air Transport

On August 29 a French air service was re-opened for passengers and mails between Marseilles (Marignane) and Ajaccio in Corsica. Previously an air line had been opened between Marseilles and Algiers.

According to an American report, the Danish Air Lines (D.D.L.) have resumed daily services between Copenhagen and Malmö. The same report states that the Swedish company A.B. Aerotransport has been given permission by the German authorities to inaugurate an air line between Stockholm and Copenhagen, but it is understood that this has not yet been opened.

Indian Railway Company Presents Spitfire

The "Bombay Baroda & Central India Railway Spitfire No. 1" has now been completed. It is believed that this is the first aeroplane to be presented by a railway company of the Empire.

Berlin Railway Bombed

Berlin railway stations and main lines near the capital have been attacked several times during the present month. On September 4 the Air Ministry announced the bombing of main-line railway concentrations to the west of the City. On September 9 the Potsdamer station was repeatedly hit with heavy bombs and incendiaries. This station handles traffic for Magdeburg and south-west Germany. The pilots of all machines engaged in the raid claimed direct hits on the station and its yards. On September 11-12 the nearby and more important Anhalter station building and tracks were bombed, as also was a large railway yard near the Potsdamer station. Since then there have been several further attacks on the capital.

It is reported from New York that portions of the Berlin underground system have been interrupted by the R.A.F. raids. A message from the American Trans-Ocean News Agency correspondent in Berlin states that "two branch lines of the Berlin central underground system" were ordered to be closed on August 30 because of damage sustained in the raid of the previous night. German officials insisted that the closure was a precaution against possible time bombs. The correspondent, however, said there was reason to believe that one of the underground junctions had been damaged and that it was also reported that the entire Berlin underground power system had been put out of order.

Goods Yards at Brussels Bombed

The Czechoslovak Bomber Squadron recently formed in this country made its first raid over enemy territory on September 12, when it took part in a successful attack on a railway goods yard at Brussels. The Germans are stated recently to have been routing much of their military traffic through Brussels, and the yards there have also been visited by the R.A.F. recently. After an attack on the night of September 12-13, a fire three-quarters of a mile long was observed on the north of the yard, and on each of the two following nights heavy explosions were caused.

XUM

MINISTRY OF TRANSPORT ACCIDENT REPORT

Between Aviemore and Carrbridge, L.M.S.R.: March 5, 1940

Mr. J. L. M. Moore, assisted by the Hon. H. T. de B. Bingham, inquired into the accident which happened at 8.36 p.m. on March 5, 1940, about two miles north of Aviemore station, L.M.S.R., when 21 wagons and a 20-ton brake van, which had become detached from the 1.30 p.m. mineral train, Perth to Inverness, when it was on the 1 in 70 incline approaching Slochd Summit crossing loop, owing to the failure of a drawbar hook, and had run back out of control for 9¼ miles, through Carrbridge station, collided at high speed with the double-headed 2.45 p.m. freight train, Perth to Inverness, which was approaching at about 35 m.p.h. Considerable damage was done. The pilot engine of the 2.45 was thrown over on its side at right angles to the track; telescoping occurred near the front and five vehicles were wrecked. The brake van and 14 rear vehicles of the runaway were also wrecked. The driver and fireman of the overturned engine were killed; the guard of their train sustained cuts and bruises. The guard of the runaway jumped clear on realising that he could not control it, escaping with severe shaking and shock. The weather was fine and the rail dry.

The single line from Aviemore to Slochd, 12 miles, is on a rising gradient all the way except for less than a mile down at 1 in 100 and level before reaching Carrbridge station. That station, 6½ miles from Aviemore, has a 650-yd. loop with platforms at the north end, a crossover and up siding connection. There are two signal boxes, but the token instruments, etc., are in the booking office and there is slotted lever control over the starting signals for convenience, as the signalman has to spend much of his time there.

The 1.30 p.m. train consisted of standard Class "5" 4-6-0 engine No. 5160, 30 loaded vehicles and a 20-ton Highland Railway type brake. It weighed 460 tons, exclusive of the engine, and a second similar locomotive, No. 5017, was attached in front, with G. McAdie, passed fireman for 3 years 9 months, as driver and duly responsible under Rule 135(*a*); he agreed, however, with P. MacDonald of the train engine, that the latter should take charge, as he was a far more experienced man. The train stopped at Slochd home signal at 8.21 p.m. but was allowed to draw into the loop later by Signalman A. Ferguson, stopping there at 8.26 p.m. Ferguson saw that it was incomplete, but appears to have thought that the remaining portion was standing in rear of the home signal. He left his box and conferred with the drivers, who were unaware of the breakaway, before telephoning to Signalman James Calder at Carrbridge at 8.28 p.m., telling him he thought the vehicles were between his distant and home signals. Calder almost immediately after heard a rumbling noise and saw red lights approaching at speed from Slochd. The runaway being already on the points controlled from Carrbridge North box, he could do nothing but send "obstruction danger" in both directions. He had accepted the 2.45 p.m. train 10 minutes earlier and, not getting immediate acknowledgment from Aviemore North box, spoke on the control circuit to the station asking for the train to be held; he learnt that it had just left and he got "train entering section" at 8.30 p.m. The Aviemore North signalman, just returned from giving the token to the train, tried to get it stopped by one of the intermediate level crossings, but without avail. Driver A. MacKenzie, of the train engine, saw red lights a short distance away about 2½ miles from Aviemore, when travelling at about 35 m.p.h.; sparks made him think they were on a runaway, and, shutting the regulator, he realised that the leading driver had also seen what was wrong. Before speed could be appreciably reduced the collision occurred.

The Broken Drawbar Hook

The broken drawbar hook was on an 8-ton privately owned "converted" wagon. It was of wrought iron, and the failure occurred at the base of the hook, the circumferential measurement at the point of fracture being 9¾ in., compared with the minimum permissible one of 9 in. About 90 per cent. of the fracture revealed a coarsely crystalline structure, there being a small area of fibrous metal at the bottom of the section. It was not flawed and there were no visible defects which could have been detected by external examination. Physical and chemical tests gave the following results:—

Yield point, tons per sq. in. ...	14·7
Ultimate tensile, tons per sq. in. ...	20·4
Elongation in 2 in.	8 per cent.
Contraction of area	17 per cent.
Carbon content	0·02
Silicon content	0·11
Manganese content	0·09
Sulphur content	0·02
Phosphorous content	0·26

Elongation and contraction may be considered low but were no doubt influenced by the fact that the specimen was taken from a position transverse to the direction of rolling the bar and would in turn affect the ultimate tensile strength as revealed by tests. Otherwise the analysis compared favourably with the quality of wrought iron which was permissible for the construction of drawbars up to 1923, when welding steel was specified for new work. In March, 1934, it was further specified that all new drawbars would be to B.S.S. 80. There is no record of a drawbar having been changed or repaired on this wagon since steel became compulsory.

Inspecting Officer's Conclusions

Although the material of the drawbar appears to have been sound, its capacity for resisting shock was no doubt adversely affected by its crystalline structure. The failure was due either to a rebound when the train was brought to a stand at Slochd home signal, or to a snatch when it was being restarted.

Consideration of the evidence and a comparison of times leads Mr. Moore to the view that the drawhook failed when the train was brought to a stand at the home signal and was the result of a slight rebound due to the use of the brake, which should have been unnecessary. Driver MacDonald said it was required owing to the curve and rock cutting at the approach to Slochd causing his view to be curtailed by the engine in front; it is regrettable that it was he who was controlling the train, an irregularity for which he and Driver McAdie are jointly responsible. For the serious consequences of the breakaway Guard Moyes and Signalman Ferguson are held responsible. Although Moyes's van had no sanding gear, he had sufficient brake power to hold the rear portion of the train while stationary or even moving slowly. He probably lost valuable moments before realising in the darkness in which direction he was moving, which was pardonable, but had there been a guard of more extensive experience of the severe gradients on the Highland section the runaway might have been avoided. Once Moyes, who was competent to be in charge, realised he was travelling in the wrong direction he appears to have done all he could. After jumping off, however, he appears to have lost his head and walked to Carrbridge, whereas had he gone to Slochd Signalman Ferguson might have known of the runaway earlier. This signalman made a grave error in assuming the missing portion to be stationary near the home signal. Appropriate action at once might have enabled Signalman Calder at Carrbridge to derail the runaway and the 2.45 p.m. train to be held at Aviemore. Ferguson should have been alive to the possibilities of the severe gradients in the neighbourhood; he displayed a lack of quickness of mind. The Carrbridge and Aviemore signalmen, however, acted promptly.

Recommendation

It has been realised for some time that wrought iron drawgear does not fulfil all the requirements of modern traffic conditions. The change-over to steel appears to be taking place as expeditiously as practical circumstances permit, but must take time and, even when completed, will not entirely eliminate the possibility of trains parting. Consideration should be given therefore to the provision of suitable means of reducing to a minimum the effects of a breakaway. Much can be

done by an alert, skilful guard, who should have at his disposal as much brake power as possible. The use of brakevans fitted with sanding gear should be extended, and on certain hilly sections of the line be made obligatory.

Certain fortuitous factors in connection with every breakaway may render a guard almost helpless from the start. In localities where exceptional conditions exist, provision should be made for dealing with a runaway in an emergency. They unquestionably exist between Carrbridge and Slochd. If this were a double line, catch points would certainly be provided; with single track this question is not so simple, but means should be devised to prevent a train running back uncontrolled towards Aviemore.

The only possibility of doing so now is by reversing the Carrbridge north end loop points while runaway vehicles are passing over them, hardly a practicable act for various reasons and not to be regarded as a reliable safeguard. A number of alternatives were considered at the inquiry and have been dealt with by correspondence. The company has suggested electrically operated catchpoints sufficiently far north of Carrbridge to ensure that any derailment they effected would not involve risk to the users of the public roadway immediately north of the station. Control of these points would be provided in the existing booking office, and they would be proved closed and bolted for up trains, and trailable for down trains, by withdrawal of the respective section token. There is no objection in principle to this so long as it is made impossible to obtain a token at Slochd for an up train unless the catchpoints are set and bolted for through running and are held in this position until the train has arrived at Carrbridge and the token has been put in the instrument. Similarly, means should be provided whereby a token cannot be withdrawn there for a down train unless the catchpoints are set to derail a runaway and free to be trailed; they must be maintained in this position until a train has reached Slochd and the token been put in the instrument there. It is also necessary that starting signal token locking should be provided.

If these requirements can be suitably complied with, electrically operated catchpoints would appear to fulfil all that is necessary at this particular place. Their provision is recommended, subject to due consideration of the controlling and safeguarding arrangements. Such equipment has the further advantage that it is independent of the station layout. It might be installed elsewhere on single lines where similar risks, resulting from long and sustained falling gradients, exist. This possibility is already receiving the attention of the company.

RAILWAY AND OTHER REPORTS

Transport Services Limited—Final dividend is 6 per cent. making 10 per cent. against 5 per cent. for previous year.

Egyptian Delta Light Railways Co. Ltd.—Net revenue to March 31, 1940, was £28,491 against £26,237, plus interest and dividends £7,177 (£6,540). After all fixed charges there is a debit balance of £4,994 (£5,485) which deducted from £40,989 brought in leaves a debit of £35,995. Number of passengers declined 1,090,844 to 13,327,181 and gross receipts were £4,803 lower at £131,105. Gross receipts from goods traffic were £81,822, up £3,398; tonnage at 695,936 was higher by 88,149 tons. Total railway expenditure was £188,028 (£193,594). Operating ratio was 86·84 per cent. (88·69 per cent.).

Lancashire United Transport & Power Co. Ltd.—Interim dividend for year to December 31, 1940, is again 4 per cent.

Cowans, Sheldon & Co. Ltd.—Trading profit to June 30, 1940, was £75,020 (against £62,896), plus rents, etc., £1,130 (£1,056); depreciation takes £4,287 (£4,123), fees £600 (no change), tax £51,100 (£13,000), staff fund £1,407 (£3,225); net profit £18,756 (£43,004); dividend is repeated at 10 per cent. There is placed to reserve £3,500 (£25,000), and £53,695 (£53,440) is carried forward.

North Central Wagon Co. Ltd.—Revenue from rents and other profits to June 30, 1940, was £59,254, against £109,228. After debenture interest, directors' fees, and tax provision, net profit was £16,295, against £43,877. Balance after dividend on 6½ per cent. preference shares is £12,196, which with £5,900 brought in is carried forward. No dividend is payable on the ordinary capital, against 15 per cent. for the previous year.

Cape Eastern Main Line Improvements, South Africa

Steady progress is reported upon the various deviations—aggregating no less than 70 miles in length—between East London and Queenstown. They are being undertaken (i) in order to reduce the ruling gradient from 1 in 40, uncompensated for curvature—equivalent to 1 in 33 compensated—to 1 in 50 compensated; (2) to ease the sharpest curves from 330-ft. radius to more than twice that radius; (3) to shorten the distance (between Amabele and Imvani) by some 16 miles; and (4) to reduce the total curvature by 20,692 deg.

The Total Work Entailed

Altogether about 3,000,000 cu. yd. of fill will be used in embankments, and a slightly smaller quantity in cutting excavation. Over 14 miles of the new formation are already complete. The tunnelling is, however, the most interesting feature of the undertaking; 10 tunnels in all will be driven, of which one is finished and three are under construction. The completed tunnel is 1,038 ft. in length and was constructed departmentally in nine months by modern methods. The various deviations will be brought into use as finished, and it is expected that the last will be completed early in 1944.

Between Egerton and Blaney two deviations are in hand, one eight and the other three miles in length. On the former some 250,000 cu. yd. of fill and slightly less excavation are required; about four miles of formation have already been completed. The three-mile deviation is finished and ready for opening. Between Blaney and Amabele nearly 13 miles of deviation work is in hand, entailing some 400,000 cu. yd. of earthwork; 4¼ miles of formation are complete.

Entirely New Line from Amabele to Imvani

From East London to Amabele the deviations are in short lengths, but beyond Amabele an entirely new line is being constructed all the way to Imvani, involving much heavy work. Between Stutterheim and Toise river, where new stations are being built, there are several tunnels, two of them being below the existing line; the river is crossed by a high bridge.

At Thomas river also a new station and bridge are being built, and thereafter a considerable length of steep sidelong ground is traversed by the new line, necessitating two more tunnels and heavy retaining walls and earthworks; new stations are being built at Surbiton, Gaika, Cathcart, and Waku. Before reaching Imvani there are three more tunnels, and the new Imvani station will be half-a-mile from the existing one.

BUSINESS LETTERS TO ENEMY COUNTRIES.—Failure to obtain approval of the Tradin , with the Enemy Branch of the Board of Trade is causing delay in the transmission of business letters and cables to places abroad. Communications, unless relating to copyright, patents, designs, or trade-marks, should be sent to the Trading with the Enemy Branch, Imperial House, Kingsway, W.C.2, with an unsealed, stamped, and addressed envelope, and, if in a foreign language, by an English translation. Correspondence relating to copyrights and so forth must be sent to the Patent Office.

XUM

NOTES AND NEWS

Wear Navigation & Sunderland Corporation Quay.—The Ministry of Transport has authorised an increase of not more than 40 per cent. in all rates, rents, tolls, dues, and charges in operation on September 3, 1939.

Portland Train Services—A revised passenger train service (liable to alteration) has been introduced on the Melcombe Regis (Weymouth) and Portland line. The service between Portland and Euston has been suspended.

Dover, St. Margarets & Martin Mill Light Railway—Application is being made by the Dover, St. Margarets & Martin Mill Light Railway Company to the Ministry of Transport for an Order under the Special Enactments (Extension of Time) Act, 1940, in respect of powers conferred by the Light Railway Order, 1909.

New C.N.R. Air Line.—Trans-Canada Air Lines, a Canadian National subsidiary, inaugurated a new air service between Detroit, Mich., and Toronto, Ont., on August 1. The new 195-mile route extends from the Windsor (Ont.) airport (across the river from Detroit) to Toronto for regular passenger, mail, and express service, and makes direct connections at Detroit for Chicago, and at Toronto for Ottawa, Montreal, Que., the Maritime provinces, and the Canadian west. Two round-trips are scheduled daily, with a stop at London, Ont. The new air line brings the total route mileage of Trans-Canada Air Lines to almost 4,000 miles.

Anglo-Scottish Railways Assessment.—According to the report of the Anglo-Scottish Railways Assessment Authority for the year ended March 31, 1940, the authority is proceeding with the ascertainment and apportionment of the average net receipts for the years 1935-1939 by reference to which the next cumulo valuations—the third—of the undertakings in England and Scotland of the two Anglo-Scottish railways will be ascertained. Test investigations regarding the apportionment of gross receipts were completed by the railway companies during the year under review for selected periods in the year 1937, and these results are being investigated by the accountants of the authority.

Leeds Corporation Light Railways—The Minister of Transport has made the Leeds Corporation Light Railways (Extension of Time) Order, 1940 (S.R. & O., 1940, No. 1547), extending the time laid down in the Leeds Corporation Light Railways (Extension) Order, 1935, during which the Corporation is required to complete Light Railway (No. 2) thereby authorised.

European Trains at the World's Fair.—The Coronation Scot train of the L.M.S.R. is to remain in the U.S.A. after the World's Fair at New York closes on October 10. It will be stored at Baltimore because of the hazards of shipping the train to Europe. The Italian streamlined electric train is also remaining in the U.S.A. for a similar reason. It will be recalled that the Coronation Scot was stored at Baltimore last winter by the Baltimore & Ohio Railroad.

Argentine Freight Relative to Price.—The Institute de Estudios Económicos del Transports of Buenos Aires has published some interesting figures showing the proportion represented by railway freight to the total cost at the port, of the principal grain products of the country. Based on figures for the agricultural year 1936-37, the railway freight on wheat, from all the different zones of production, averaged 1·07 pesos, or 13·8 per cent. of the total cost at the port. On maize the railway charges represented 16·3 per cent. of the total cost, and on linseed 10·7 per cent. It is not stated whether tonnages from the different zones were taken into account in arriving at the averages.

Soviet Railway News.—The northern Danilov-Archangel section of the Moscow—Archangel railway is to be doubled; the Moscow-Danilov division has been double line for many years. The Khabarovsk - Komsomolsk line in eastern Siberia is reported to have been opened to traffic throughout its length, and thus makes Komsomolsk an alternative outlet to Vladivostok for traffic on the Trans-Siberian Railway.

Federated Malay States Railways.—Railway revenue from all sources for the month of June, 1940, was £175,950 compared with £118,606 for the corresponding period of 1939. The total revenue for the period January to June, 1940, was £1,103,444 compared with £802,752 for the corresponding period in 1939.

Irish Traffic Returns

IRELAND		Totals for 36th Week			Totals to Date		
		1940	1939	Inc. or Dec.	1940	1939	Inc. or Dec.
		£	£	£	£	£	£
Belfast & C.D. (80 miles)	pass.	4,245	2,579	+ 1,666	120,469	98,324	+ 22,145
	goods	946	509	+ 437	20,535	15,954	+ 4,581
	total	5,191	3,088	+ 2,103	141,004	114,278	+ 26,726
Great Northern (543 miles)	pass.	18,200	14,250	+ 3,950	441,400	420,550	+ 20,850
	goods	15,500	11,300	+ 4,200	446,900	366,050	+ 80,850
	total	33,700	25,550	+ 8,150	888,300	786,600	+ 101,700
Great Southern (2,076 miles)	pass.	51,804	56,888	− 5,084	1,297,406	1,374,072	− 76,666
	goods	52,421	50,967	+ 1,454	1,638,023	1,456,373	+ 181,650
	total	104,225	107,855	− 3,630	2,935,429	2,830,445	+ 104,984
L.M.S.R. (N.C.C.) (247 miles)	pass.	6,960	4,360	+ 2,600	209,760	176,700	+ 33,060
	goods	5,730	3,250	+ 2,480	138,190	104,430	+ 33,760
	total	12,690	7,610	+ 5,080	347,950	281,130	+ 66,820

British and Irish Railway Stocks and Shares

Stocks	Highest 1939	Lowest 1939	Prices Sept. 17, 1940	Prices Rise/Fall
G.W.R.				
Cons. Ord.	38	21½	28	−1
5% Con. Pref. ...	92	71	75	−4
5% Red. Pref. (1950)	98	83	93½	—
4% Deb.	103	91	102½	+½
4½% Deb.	105½	93¾	103¼	—
4½% Deb.	110	99	108½	—
5% Deb.	121	109½	112½	—
2½% Deb.	63½	54	62	—
5% Rt. Charge ...	117	104	110½	—
5% Cons. Guar. ...	111	96½	104½	−1
L.M.S.R.				
Ord.	17	9½	11¾	−¼
4% Pref. (1923) ...	46½	20	31	−2½
4% Pref.	63½	37½	44½	−2
5% Red. Pref. (1955)	83	58½	73½	—
4% Deb.	98½	85	90½	−1½
5% Red. Deb. (1952)	109	101½	106	—
4% Guar.	87⅞	73	74	−1
L.N.E.R.				
5% Pref. Ord. ...	5¾	3½	2¾	—
Def. Ord.	3½	1¾	1½	+¼
4% First Pref. ...	38½	19	28½	−3¼
4% Second Pref. ...	15	7⅜	9½	−½
5% Red. Pref. (1955)	55	38	50	—
4% First Guar. ...	78½	60	64	−1¼
4% Second Guar. ...	68⅜	47	53½	−2½
3% Deb.	71¾	57	61¾	−¼
4% Deb.	93	76	82	—
5% Red. Deb. (1947)	106½	98	103	—
4½% Sinking Fund Red. Deb.	104½	96	99½	—
SOUTHERN				
Pref. Ord.	78	46½	41	−3
Def. Ord.	19½	7	10	—
5% Pref.	100	76	73½	−1¾
5% Red. Pref. (1964)	102 1/16	94	87½	—
5% Guar. Pref. ...	116½	103	105½	—
5% Red. Guar. Pref. (1957)	112½	102½	103½	—
4% Deb.	103	91½	98½	−½
5% Deb.	118½	109½	112½	—
4% Red. Deb. (1962–67)	106	98	101½	—
4% Red. Deb. (1970–80)	102	96	100½	—
FORTH BRIDGE				
4% Deb.	98 11/16	81	87½	—
4% Guar.	95	80	85½	—
L.P.T.B.				
4½% "A"	115	103	106¾	−½
5% "A"	123	106½	114½	+1½
4½% "T.F.A." ...	105	100⅛	102	—
5% "B"	117½	102	102½	−2½
"C"	84	63⅞	27½	−½
MERSEY				
Ord.	24 17/32	17½	20½	—
4% Perp. Deb. ...	93⅜	88¾	89	—
3% Perp. Deb. ...	77	65½	59½	—
3% Perp. Pref. ...	55	49¾	54½	—
IRELAND				
BELFAST & C.D.				
Ord.	6	3	4	—
G. NORTHERN				
Ord.	6	2½	2	—
G. SOUTHERN				
Ord.	13½	8	6	—
Pref.	26	10	19½	−1
Guar.	40½	22	20	−½
Deb.	57	45⅜	41	−1

OFFICIAL NOTICES

The Institute of Transport Examinations, 1941

NOTICE IS HEREBY GIVEN that, circumstances permitting, the Graduateship and Associate Membership Examinations will be held in London and at other centres on Monday, Tuesday and Wednesday, May 5th, 6th, and 7th, 1941.

The latest date for the deposit of forms of entry is March 31st, 1941 (January 1st if any exemptions are claimed). Full particulars, previous question papers (price 1s. per set, post free) and copies of the booklet "The Institute of Transport Examinations: notes for the guidance of candidates unable to attend preparatory courses" (price 1s. 2d. post free) may be obtained from the undersigned.

By Order of the Council,
A. WINTER GRAY,
Secretary.

15, Savoy Street,
London, W.C.2.

London and North Eastern Railway

NOTICE IS HEREBY GIVEN that, for the purpose of preparing the Warrants for Interest payable on the 15th October, 1940, on the Company's 5 per cent. Redeemable Debenture Stock, the balance will be struck as at the close of business on *27th September*, and such Interest will be payable only to those Stockholders whose names are registered on that date.

Transfers of the 5 per cent. Redeemable Debenture Stock should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5.0 p.m. on 27th September.

By Order:
P. J. DOWSETT,
Secretary.

Marylebone Station,
London, N.W.1.
17th September, 1940.

THE INDIAN STANDARD WAGON CO. LTD. require a SPRING SHOP FOREMAN. Applicants must have a wide experience in the manufacture, heat treatment and testing of laminated, volute and helical springs for railway rolling stock. Apply by letter, stating age and whether married, and giving full details of experience to The Indian Standard Wagon Co. Ltd., Bradenham House, High Wycombe, Bucks.

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Wednesday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

Staff and Labour Matters

Work during Air Raids

As a result of consultation between the Government, employers' organisations and the Trades Union Congress a solution has been found to the problem of maintaining production in spite of air raids. Under the new system watchers will be posted on roofs of industrial establishments after an air raid alarm has been given and will make arrangements to give the workers a signal when they should cease work.

A leaflet has been issued on the subject with a foreword by the Prime Minister. Mr. Winston Churchill says "Experience may show that the system is capable of improvement, but let us co-operate to make it work so as to minimise the dangers of surprise in these destructive attacks from our cruel and relentless enemy. Together, this plan was drawn up by employers and employed alike. So let us all work it together, improving it where we can in the light of experience, till victory comes."

The leaflet states that in order to meet air attack and to develop our counter-offensive, it is essential that there should be the least possible interruption to all work vital to the country's needs. The Government is therefore confident that all employers and workers on essential work, including export trades, will be willing, wherever possible, to carry on after the siren until it is clear that enemy attack is imminent, and to resume work when the immediate danger has passed without waiting for the public "Raiders Passed" signal. For this purpose an industrial warning system is needed within the framework of the existing system of public warning by siren. Henceforth the warning by siren will be regarded as an *alert* and not as an *alarm* signal. In this way maximum industrial output can be combined with the greatest possible protection for those at home.

Working after the siren clearly involves risk, but all engaged on vital production are front line troops. There is no room for foolhardiness or the taking of unnecessary risks and to keep down the risks involved it is essential: (1) That watchers should be posted on roofs or other vantage points to give warning of danger; and (2) That protection should be provided at or near the actual work places. Whatever arrangements are made should be the result of discussion between the management and the workpeople concerned.

Working after the siren will not affect workers' rights to compensation for personal injury under the Government scheme or their rights under any life insurance policy which covers war risks; nor does it affect the employers' position under the Personal Injuries (Emergency Provisions) Act.

The leaflet also states that watchers for duty by day or by night should be selected by agreement between the management and the workers. They should be able to reach shelter quickly from their posts and, if necessary, shelter should be specially provided for them. Watchers should act on evidence of enemy activity in the neighbourhood, such as gunfire, bombs, flares, and searchlights. They can start at once, but the R.A.F. is prepared to provide training. The arrangements for stopping work and taking shelter and for resuming work before the "Raiders Passed" are matters for adjustment between the management and the workpeople, but there must be a system by which the decision to stop work is immediately communicated throughout the works.

ICE CONSUMPTION ON THE C.N.R.—During the last twelve-monthly period the Canadian National Railways purchased no less than 211,000 tons of ice. Of this quantity, 58,000 tons were used for air-conditioning passenger cars on the C.N.R. system in Canada, the Grand Trunk Western lines west of the St. Clair river, and the Central Vermont system. Each car requires from 4,800 to 5,500 lb. of ice for initial icing and anything from 200 lb. to 1,000 lb. for replenishing the supply on the run, the quantity depending upon the outside temperature. The remainder of the ice purchased annually is used for refrigeration, dining and sleeping car and coach services, iced water always being available.

Contracts and Tenders

The Bengal-Nagpur Railway Co. Ltd. has placed with the undertakings below orders for the goods named:—

English Steel Corporation Limited; springs.
Monkbridge Iron & Steel Co. Ltd.: locomotive tyres.
Taylor Brothers & Co. Ltd.: steel axles.
Superheater Co. Ltd.: superheater elements.
North British Locomotive Co. Ltd.: steel crank axles.
C. A. Parsons & Co. Ltd.: steam turbo-alternator and switchgear.
I.C.I. Metals Limited: copper pipes.
Thomas Bolton & Sons Ltd.: copper rods.

June shipments of locomotives from the United States totalled 39, compared with 43 in May and 32 in June, 1939, according to reports received by the Department of Commerce Bureau of the Census from builders other than railroad shops, states the *Railway Age*. Total shipments for the first six months of 1940 involved 243 locomotives compared with 139 in the first half of last year. Unfilled orders at the close of June amounted to 146 locomotives, and included 81 steam, 38 diesel-electrics, and 5 of other types. for domestic service, and 22 steam for export. At the close of May there were unfilled orders for 152 locomotives, and the total was 151 on June 30, 1939. The 39 locomotives shipped in June included 5 steam and 30 diesel-electrics for domestic service and four steam for export. Data supplied by the Car Service Division, Association of American Railroads, on locomotive building in railroad shops show that 8 locomotives, 5 steam and 3 electrics, were produced in June, compared with 3 (all steam) built in June, 1939. During the first six months of the present year there were 42 locomotives (25 steam and 17 electrics) built in railway shops; the comparable total for the first half of 1939 was 27, including 10 steam and 17 electrics. On July 1, there were on order in railway shops 16 locomotives, comprising 13 steam and 3 electrics.

Forthcoming Meetings

Sept. 26 (*Thurs.*)—**Egyptian Delta Light Railways Co. Ltd.** (Annual general), Gresham House, Old Broad Street, E.C., at noon.

XUM

Railway Stock Market

As was to be expected, the volume of Stock Exchange business has remained at a very low level because of the frequent air raids on London. Nevertheless, sentiment has been influenced more by the absence of heavy liquidation than by the small amount of buying orders, and under the lead of the firmness of British Funds, a calm and steady undertone has been maintained in the stock and share markets. In sympathy with the general tendency, home railway securities were slightly lower on balance, but there was very little selling, and prior charges remained in short supply. Contrary to some expectations, the temporary interruption of various transport services has not led to weakness in railway securities; it has been realised that the air raid damage suffered by the railways has been relatively moderate and that repairs can be effected in a remarkably short time. Substantial yields are offered by L.M.S.R. and L.N.E.R. preference stocks, and all points considered, it is not surprising that the general disposition is to be prepared to take more than a very short view and not to sell at the present time. On the other hand, it is unlikely demand will develop until markets become reasonably active. The air raids are regarded merely as an incident in the war, and the more immediate outlook for all classes of securities may turn on whether the continued threat of invasion materialises. Improvement in Argentine railway securities, noted a week ago, has now extended from prior charges to stocks of the junior class, but the gains are out of proportion to the demand experienced, and arise in part from the small amount of stock available in the market. It is realised that financial results of the Argentine railways for the year ended June 30 last, will reflect the very disappointing traffics, but in the market the tendency is to take a more encouraging view of the future, although at the moment this is based mainly on the report that the British Government is negotiating with Argentina for a large credit for the purchase of cereals, meat and other products.

As compared with a week ago, Great Western ordinary stock was only fractionally lower at 28, but the 5 per cent. preference reflected selling in connection with a deceased estate, and on balance declined from 78½ to 74½. The 4 per cent. debentures were a point down at 102½. A little selling of L.M.S.R. preference stocks was reported, and the 4 per cent. senior stock was easier at 44½, while the 1923 preference was 30½, compared with 33 a week ago. L.M.S.R. ordinary, however, was maintained at 11¾, and the guaranteed stock was little changed at 74½; the 5 per cent. debentures were again 106, and the 4 per cent. debentures declined a point to 90½.

L.N.E.R. first guaranteed was only fractionally lower at 64½, as was the second guaranteed at 54½; but the first preference has been lowered from 31 to 28½, although the second preference remained at 10. As to L.N.E.R. debentures, the 4 per cents and 3 per cents were maintained at 62 and 82 respectively. Southern preferred has been lowered two points to 41, and the deferred stock was 9½, compared with 10 a week ago. Moreover, the 5 per cent. preference was reduced to 73½, and is still a point below the equivalent stock of the Great Western. Southern 4 per cent. debentures were lower at 97.

Among Argentine railway securities, B.A. Gt. Southern 4 per cent. debentures further improved to 44, and advances were shown by various other debentures, while preference and ordinary stocks made gains up to a point. Canadian Pacific Railway Preference stock was bought and finished the week better at 45¾.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

	Railways	Miles open 1939-40	Week Ending	Traffic for Week: Total this year	Traffic for Week: Inc. or Dec. compared with 1939	No. of Weeks	Aggregate Traffics to Date: Totals: This Year	Aggregate Traffics to Date: Totals: Last Year	Aggregate Traffics to Date: Increase or Decrease	Shares or Stock	Prices: Highest 1939	Prices: Lowest 1939	Prices: Sept. 17, 1940*	Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	8.9.40	13,230	— 4,030	36	620,610	473,950	+ 146,660	Ord. Stk.	10⅜	4½	5¼	Nil
	Argentine North Eastern ...	753	7.9.40	ps. 187,900	+ ps. 10,400	10	ps. 1,758,100	ps. 1,837,100	— ps. 79,000	,,	4½	2	2	Nil
	Bolivar	174	Aug. 1940	3,550	— 1,350	35	32,180	34,050	— 1,870	6 p.c. Deb.	7½	5⅜	6½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds.	5⅜	4½	6*	Nil
	Buenos Ayres & Pacific ...	2,801	7.9.40	ps.1,089,000	—ps.114,000	10	ps.11,110,000	ps. 12,472,000	—ps.1,362,000	Ord. Stk.	5½	2	2	Nil
	Buenos Aires Central ...	190	20.7.40	$99,600	— $42,600	3	$258,200	$275,200	— $17,000	—	—	—	—	—
	Buenos Ayres Gt. Southern	5,082	7.9.40	ps.1,724,000	+ ps.47,000	10	ps.19,138,000	ps. 19,186,000	—ps. 48,000	Ord. Stk.	13⅜	4½	4½	Nil
	Buenos Ayres Western ...	1,930	7.9.40	ps. 562,000	—ps.106,000	10	ps. 6,122,000	ps 6,746,000	—ps. 624,000	,,	10½	4	4	Nil
	Central Argentine	3,700	7.9.40	ps.1,362,550	—ps 755,700	10	ps.14,278,150	ps. 20,987,850	—ps6.709,700	,,	11¼	4	4	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	4	1½	2	Nil
	Cent. Uruguay of M. Video ...	972	31.8.40	17,593	+ 1,583	9	157,296	150,200	+ 7,096	Ord. Stk.	2½	7/8	1½	Nil
	Costa Rica	188	May 1940	17,282	— 7,020	48	193,339	245,516	— 52,177	Stk.	24½	18	17½	11⅛
	Dorada	70	Aug. 1940	13,300	— 900	35	98,500	109,300	— 10,800	1 Mt. Db.	104½	102	98	6⅞
	Entre Rios	810	7.9.40	ps. 237,100	— ps. 44,700	10	ps. 2,397,400	ps. 2,814,400	—ps. 417,000	Ord. Stk.	6	3	1½	Nil
	Great Western of Brazil ...	1,016	31.8.40	8,000	+ 300	35	344,900	278,400	+ 66,500	Ord. Sh.	3/-	1/2½	7/8	Nil
	International of Cl. Amer. ...	794	July 1940	$419,682	— $43,933	30	$3,724,774	$3,697,627	+ $27,147	—	—	—	—	—
	Interoceanic of Mexico ...	—	—	—	—	—	—	—	—	1st Pref.	7½d.	7½d.	½	Nil
	La Guaira & Caracas	22¾	Aug. 1940	6,445	— 990	35	52,060	49,355	+ 2,705	—	—	—	—	—
	Leopoldina	1,918	7.9.40	22,650	+ 612	36	803,233	717,093	+ 86,140	Ord. Stk.	2½	½	1	Nil
	Mexican	483	31.7.40	ps. 479,200	+ ps. 200	4	ps. 1,265,400	ps. 1,282,200	—ps. 16,800	,,	1⅜	3/4	⅜	Nil
	Midland of Uruguay	319	July 1940	10,223	+ 1,081	4	10,223	9,142	+ 1,081	—	—	—	—	—
	Nitrate	386	31.8.40	6,300	+ 1,397	35	119,999	80,102	+ 39,897	Ord. Sh.	2⅛	1½	1⅜	7½
	Paraguay Central	274	7.9.40	$3,016,000	— $52,000	10	$36,005,000	$35,477,000	+ $528,000	Pr. Lt. Stk.	45½	36	38	15¾
	Peruvian Corporation ...	1,059	Aug. 1940	69,178	+ 7,745	9	134,599	125,839	+ 8,760	Pref.	1 3/16	3/16	1½	Nil
	Salvador	100	27.7.40	c13,689	+ c1,889	4	c45,961	c44,932	+ c1,029	—	—	—	—	—
	San Paulo	153½	1.9.40	35,000	+ 5,835	35	1,302,279	1,145,971	+ 156,308	Ord. Stk.	38	20	31½	7½
	Taltal	160	July 1940	2,085	+ 530	4	2,085	1,555	+ 530	Ord. Sh.	⅜	6/6	1/4	9¾
	United of Havana	1,353	7.9.40	13,194	— 8,165	10	158,538	173,023	— 14,485	Ord. Stk.	2	¼	1/4	Nil
	Uruguay Northern	73	July 1940	930	+ 106	4	930	824	+ 106	—	—	—	—	—
Canada	Canadian National	23,695	7.9.40	939,236	+ 106,134	36	32,398,590	24,753,229	+ 7,645,361	—	—	—	—	—
	Canadian Northern ...	—	—	—	—	—	—	—	— 4 p.c.	Perp. Dbs.	74¾	60	74	5⅜
	Grand Trunk	—	—	—	—	—	—	—	—	4 p.c. Gar.	100⅛	76	102	3⅛
	Canadian Pacific	17,153	7.9.40	706,000	— 95,400	36	21,946,200	18,025,600	+ 3,920,600	Ord. Stk.	7⅜	3½	5½*	Nil
India †	Assam Bengal	1,329	30.4.40	45,187	+ 6,529	4	135,060	120,437	+ 14,623	Ord. Stk.	76½	60	72½	4⅛
	Barsi Light	202	20.6.40	2,857	+ 82	12	30,577	25,597	+ 4,980	—	—	—	—	—
	Bengal & North Western ...	2,091	Aug. 1940	204,925	+ 34,908	22	1,251,276	1,076,424	+ 174,852	Ord. Stk.	277	229½	240	6½
	Bengal Dooars & Extension ...	161	20.6.40	4,433	+ 602	12	31,218	22,583	+ 8,635	,,	91	84½	215	3
	Bengal-Nagpur	3,269	20.7.40	219,450	+ 31,965	16	2,610,743	2,443,807	+ 166,936	,,	94⅜	83½	91	4⅜
	Bombay, Baroda & Cl. India	2,986	31.8.40	254,850	+ 47,100	22	3,957,975	3,504,825	+ 453,150	,,	108	90	104	5½
	Madras & Southern Mahratta	2,967	20.7.40	140,250	— 8,831	16	1,921,789	1,902,694	+ 19,095	,,	104 1/16	92	99½	7½
	Rohilkund & Kumaon ...	571	Aug. 1940	40,125	+ 5,832	22	282,833	224,369	+ 58,464	,,	280	263	250	6⅜
	South Indian	2,542	20.7.40	121,599	+ 10,755	16	1,390,463	1,294,081	+ 96,382	,,	102½	88	84½	5½
Various	Beira	204	June 1940	82,307	—	39	664,403	—	—	—	—	—	—	—
	Egyptian Delta	623	10.5.40	4,591	— 602	6	19,436	20,384	— 948	Prf. Sh.	½	¼	½	Nil
	Kenya & Uganda	1,625	—	—	—	—	—	—	—	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	B. Deb.	55	39	47½	7⅜
	Midland of W. Australia ...	277	May 1940	13,908	— 192	48	145,304	165,763	— 20,459	Inc. Deb.	91½	87½	82½	4⅛
	Nigerian	1,900	27.7.40	29,016	+ 2,233	18	631,889	480,613	— 151,276	—	—	—	—	—
	Rhodesia	2,442	June 1940	428,043	—	39	3,473,254	—	—	—	—	—	—	—
	South Africa	13,287	10.8.40	652,209	— 5,029	19	12,650,743	12,113,108	+ 537,635	—	—	—	—	—
	Victoria	4,774	May 1940	745,469	— 55,455	48	9,145,264	8,666,883	+ 478,381	—	—	—	—	—

Note. Yields are based on the approximate current prices and are within a fraction of 1/16. Argentine traffics are now given in pesos

* Quotation is of June 17, 1940; dealings subsequently prohibited † Receipts are calculated @ 1s. 6d. to the rupee